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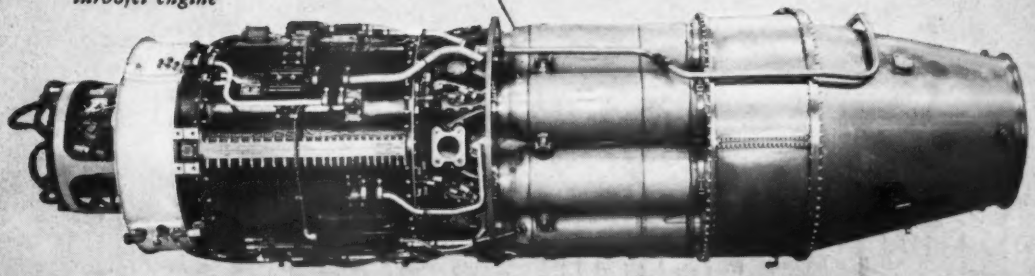

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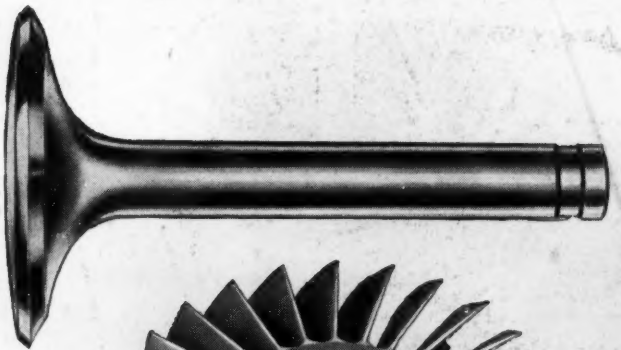

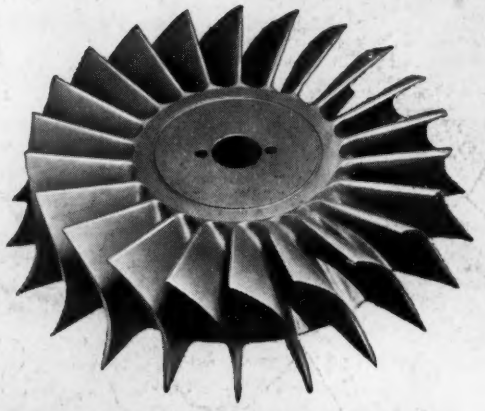

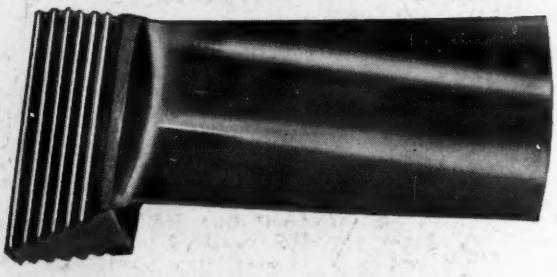

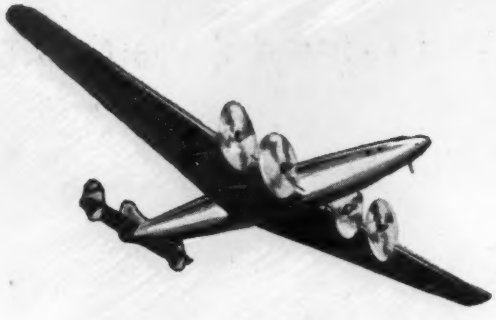

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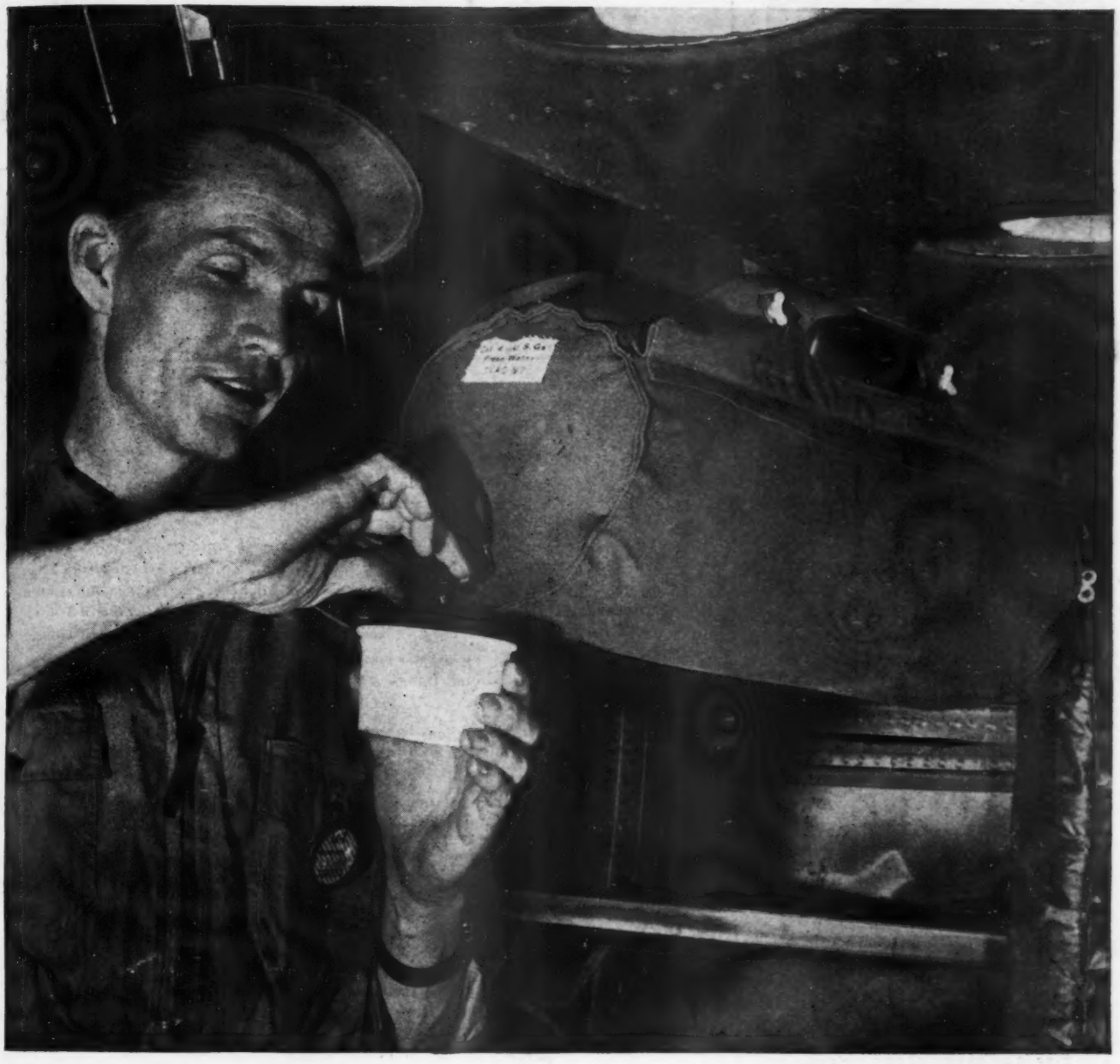

This bag helps water travel light

For maximum bomb and fuel capacity, designers of Convair's 139-ton B-36 wanted to trim every possible pound off its gross weight. One problem was to find a new material for the drinking water tanks—lighter than the metal used for standard tanks, yet strong enough to carry the load.

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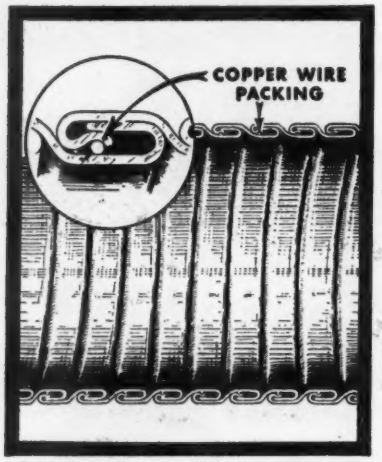

Schematic drawing of cut-out section of TITEFLEX Bendable Pipe, with enlarged view showing construction.

Exhaust tubing made from TITEFLEX Bendable Pipe is as leak-proof as tubing can be —for the joints in TITEFLEX Bendable Pipe are made pressure tight with special copper wire packing that cannot disintegrate under high temperatures. Because of its all-metal construction, TITEFLEX Bendable Pipe is practically indestructible under ordinary service conditions.

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AVIATION WEEK

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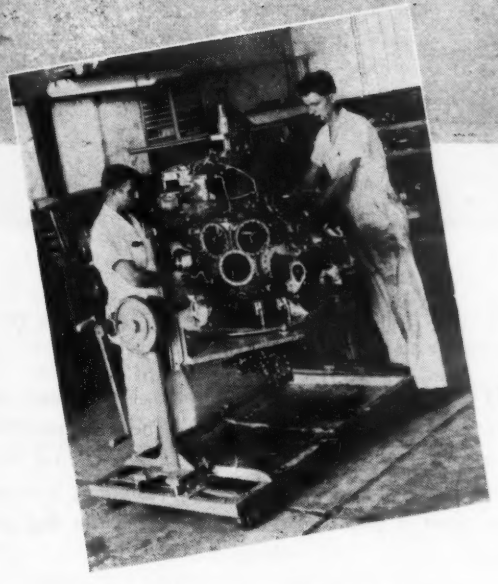

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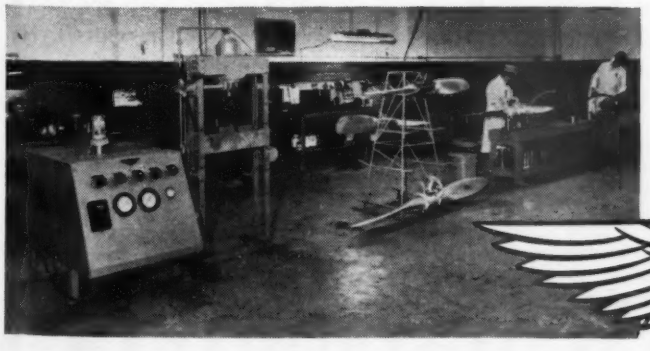

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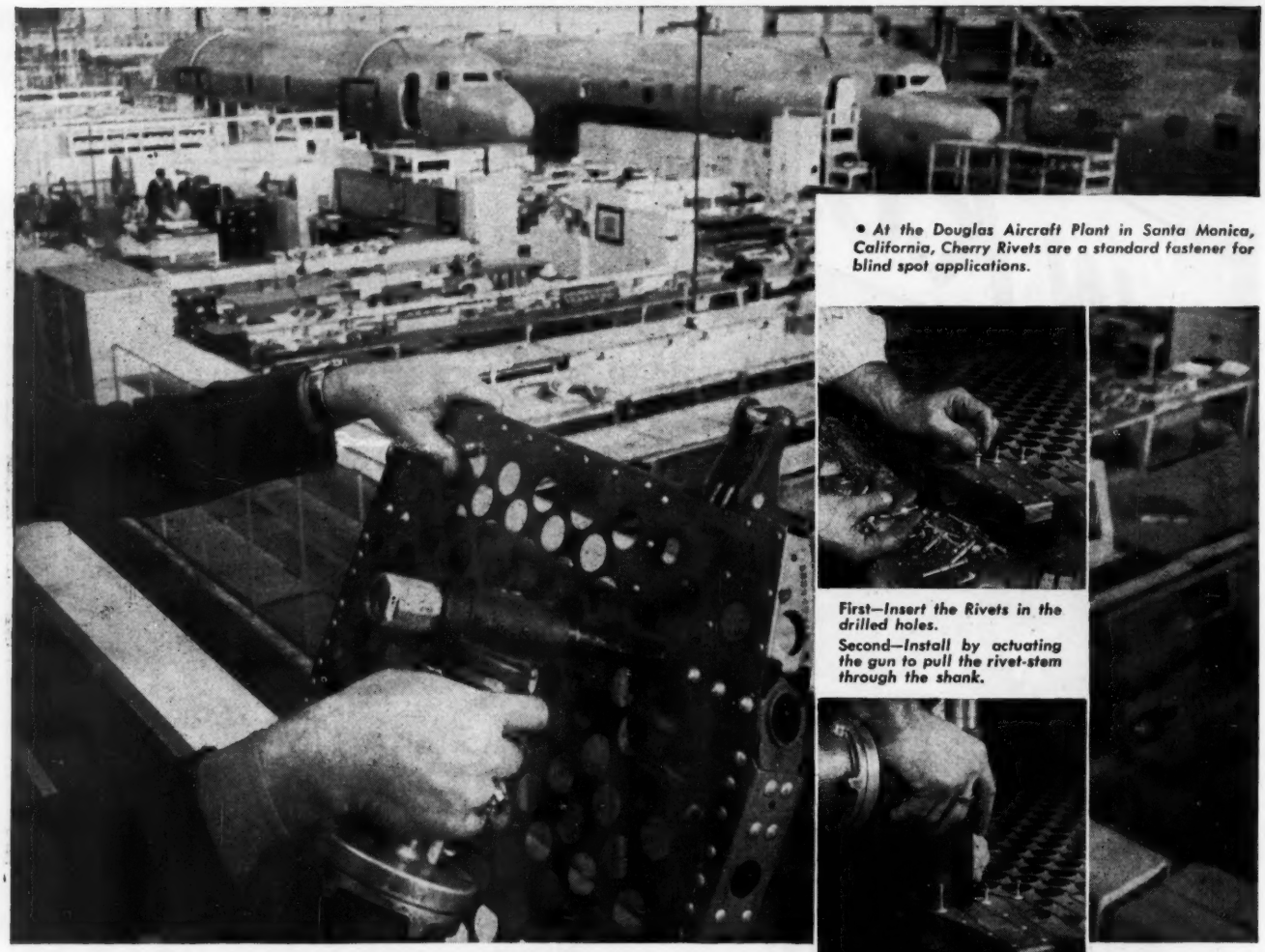

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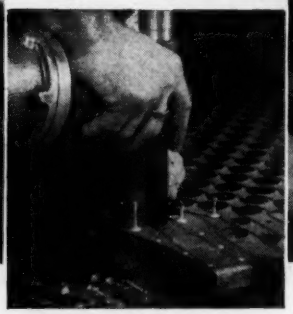

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NEWS SIDELIGHTS

New CAA Plan

Top CAA officials and John Alison, Asst. Secretary of Commerce for Air, are working on a plan to review CAA regional decisions on aircraft certification. Aircraft manufacturers are unhappy over their present inability to appeal CAA regional decisions on the new planes. CAA's present plan is to set up a board of appeal in Washington to which manufacturers can go for a review of regional decisions they feel are unfair. Current operating procedure has been strongly criticized by transport manufacturers.

Nonsched Hydras

Frequency with which operators of defunct nonscheduled airlines reappear doing business at the same old stand with a new name on the door has spurred CAB to take remedial steps. At present, there are no established requirements preventing personnel of a carrier whose Letter of Registration has been suspended or revoked from dissolving their corporate identity and forming another firm. The new company would have substantially the same personnel, would take over the suspended carrier's assets, and would continue to conduct the same type of illegal operations for which the original letter of registration was revoked. CAB has now proposed a regulation requiring an applicant for a Letter of Registration to show that the public interest and the carrier's intention to comply with legal requirements will not be adversely affected by the company's relationship to a predecessor company whose letter has been revoked or suspended.

Security Struggles

Air Force and Navy are still a long way from a uniform security policy on release of technical aviation information. Navy is now restricting all new aircraft releases to a single photo taken specifically to conceal any comparative data on size. Air Force in contrast released four different views of its latest jet fighter, the McDonnell P-85 parasite.

New Air Force public relations policy requiring all company public relations men to deal with USAF resident representatives in their plants on release of new information has been widely misinterpreted in the field. Air Force headquarters says this does not put the resident representatives into the public relations business but merely keeps them informed on what is going on. Air Force headquarters will still make the decisions. Company public relations men can still send informational copies of their requests for release of information directly to Air Force Public Relations director in Washington to insure against being short stopped in the devious channels of the Air Materiel Command.

Merger Bugs

One of the biggest obstacles to smooth merger of NATS and ATC into MATS is the wide difference in operational efficiency between the two services. For example NATS got 6.2 hours a day utilization out of its C-54s while ATC averaged only 2.3. NATS load factors were also considerably higher. Navy Air Transport experts feel that no increases in efficiency or economy will result from the transport merger unless the entire MATS operation is boosted closer to pre-war NATS standards. Unless a thorough statistical check, including cost accounting, is kept on MATS it will be difficult to determine what is really going on. Congressional aviation leaders as well as the Navy are expected to keep a close watch on MATS to make sure that promised economies and efficiency are actually delivered. Maj. Gen. Lawrence Kuter, MATS commander, has impressed the Navy favorably during the touchy pre-merger negotiations.

Senate Stymie

Legislation repealing inflexible and outmoded provisions of the 1934 Vinson-Trammell Act, vital to facilitate aircraft procurement, is stymied in the Senate. Overwhelmingly passed by the House last year and approved by the Senate Armed Services Committee, the measure invalidates the Act's provisions for a 12 percent profit limitation on Air Force and Naval aircraft contracts and its requirement that 10 percent of Naval aircraft be manufactured at the Navy-owned Philadelphia yard. Sen. Francis Myers (D., Pa.), has blocked Senate action on the measure over a dozen times when it was brought up for consideration. The Pennsylvania Senator objects to funneling aircraft construction from the plant in his home state into private industry, although it has been conclusively demonstrated that private aircraft manufacturers can turn out planes for the Navy cheaper than the government-owned yard.

RAF Rebuttal

Here is the British Air Ministry's version of the USAF B-29 test missions against England as reported by McGraw-Hill World News London correspondent Fred Brewster:

"Three squadrons of B-29 Superfortresses based in Bavaria flew routine nonstop navigational training daylight flights over England on April 19. Flying in two formations at 20,000 to 25,000 ft., they were successfully intercepted three times by RAF fighters.

"The B-29s arrived over the east coast of England near Yarmouth where they were intercepted by Gloster Meteor jet fighters. The bomber formations then swung west of London and were again intercepted this time near Guildford by deHavilland Vampire jets. As they departed over the southeast coast they were intercepted for the third time by deHavilland twin engine Mosquitoes. A single reconaissance B-29 that preceded the bombers by one hour was also intercepted by Meteors.

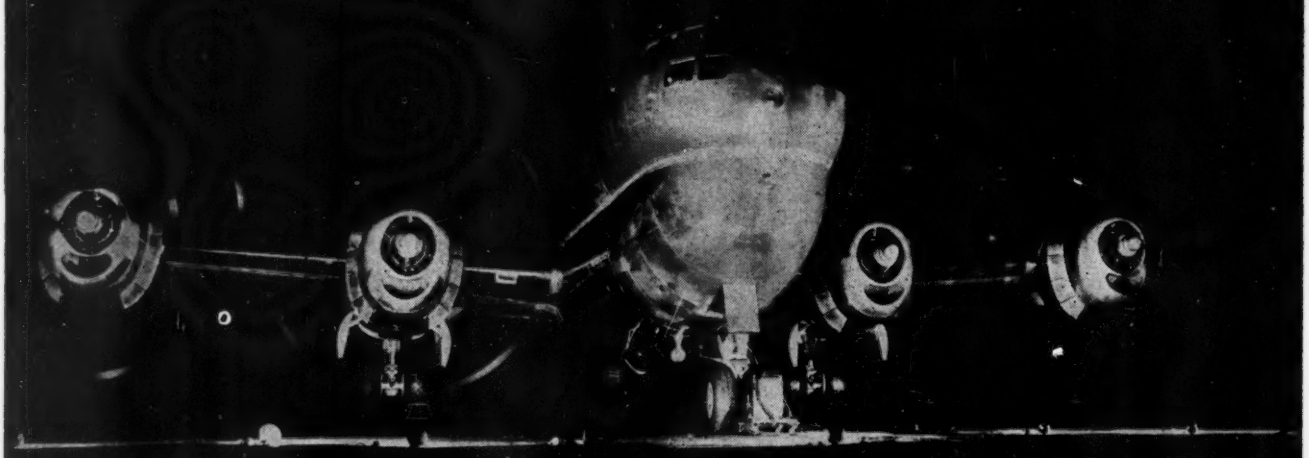
"A similar exercise was held two months earlier. No official RAF claims were made other than 'all fighters reached satisfactory attacking position' but it is understood that USAF fields in Germany are buzzing with comment on the speed and frequency of British fighter interceptions."

USAF headquarters in Washington and Europe refused to comment.

Light Training Merger?

Pentagon sources expect the flying training commands of the Air Force and Navy to be the next field for a merger to produce more of the national defense economies promised by unification. Defense Secretary Forrestal has a group of special aviation consultants including John McCone and Grover Loening, of the President's Air Policy Commission, studying this.

BIG PLANE SERVICE...



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Vol. 48, No. 20

AVIATION WEEK

May 17, 1948

70-Group Program

Type of Group	No. of Units	U. E.	Total U. E.	Pipe-line	Test	Total
M/M Bomber	21	30	630*	53	16	709
VLR Weather	2	36	72	7	2	81
VLR Photo	2	36	72	7	2	81
VLR Mapping	1	36	36	4	1	41
Fighter (Day)	22	75	1,650	165	83	1,898
Fighter (Allweather)	3	36	108	11	6	125
Light Bomber	5(3)**	48	240	24	12	276
Recon (Tactical)	4	54	216	21	10	247
Cargo (Medium)	6(5)**	48	288	29	14	331
Cargo (Heavy)	4(3)**	36	144	15	7	166
	70 Groups					3,955

(* Including 6 medium bomber groups augmented with reserve and a tanker squadron.)
(Under 66-Group program.)**

Type of Squadron	No. Units	U. E.	Total U. E.	Pipe-line	Test	Total
Emergency Rescue	6	36	216	22	9	247
Liaison	12	16	192	19	10	221
Tow Target	2	9	18	2	1	21
Geodetic Control	1	16	16	2	2	20
Photo Mapping (Special)	1	12	12	1 (Equipped with Second Line Aircraft)		
	22 Squadrons					
MATS	....	....	....	....	....	411
Training	....	....	....	....	....	1,994
Total	....	....	....	....	....	**6,869**

New Funds Will Buy 4262 Planes

With higher appropriations, USAF plans procurement of 2727 craft, mostly jet fighters. Navy to order 1535.

Final Congressional approval was given last week to the bill scheduled to pour $3,198,000,000 into the aircraft industry during the next fiscal year.

USAF will get $2,295,000,000 including procurement of 2727 new planes. Naval Aviation is authorized $905,000,000 to buy 1535 new planes (AVIATION WEEK May 10). The 2727 new USAF planes made possible by Congressional boosts in procurement funds contrast with the 978 planes authorized in the original Presidential budget for fiscal 1949.

The Air Force plans to buy 243 bombers; 1575 jet fighters and 909 miscellaneous types including photo-reconaissance, transport, training, rescue and liaison planes.

Testimony by Air Secretary W. Stuart Symington and other Air Force procurement officials indicated the following distribution of contracts:

► **Fighters** – Republic P-84; North American sweptwing P-86 and the Lockheed P-80 C with an Allison 400 jet engine, will rate new production orders as the standard USAF interceptors. Curtiss-Wright will get a production order for about 80 of its four-jet P-87 all-weather fighters. Lockheed and Republic fighter production will continue through 1950.

► **Bombers**–Boeing B-50C will be the standard long range bomber with the four jet North American B-45A continuing as the prime short range bomber for the Tactical Air Force. Production contracts for a new multi-jet medium bomber design competition recently completed will not be made before the fiscal 1950 budget. North American, Convair, Northrop and Douglas all had entries in this competition.

► **Long Range Reconaissance**–Republic will get its long awaited order for more than 20 four engine F-12 long range photo planes.

► **Transports**–Bulk of new USAF long range transports will be Boeing C-97s with Fairchild C-119 replacing the C-82 for troop carrier use. Some twin-engine transports will be purchased for feederline operations not included in MATS and tactical air transport.

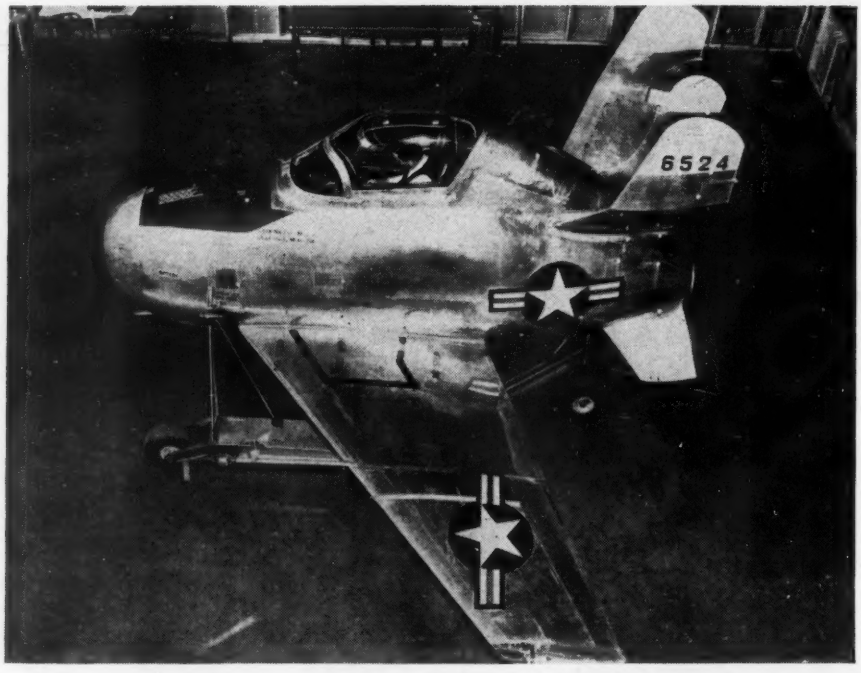
► **Trainers**–North American recently won the Air Force design competition for the new high speed trainer but production orders for this plane may be farmed out among several other manufacturers who have no military models available for production. Douglas, which submitted a radically-designed pusher plane in this competition, may be among the trainer sub-contractors. Initial order will be for close to 500 planes. Some jet trainer types will also be purchased.

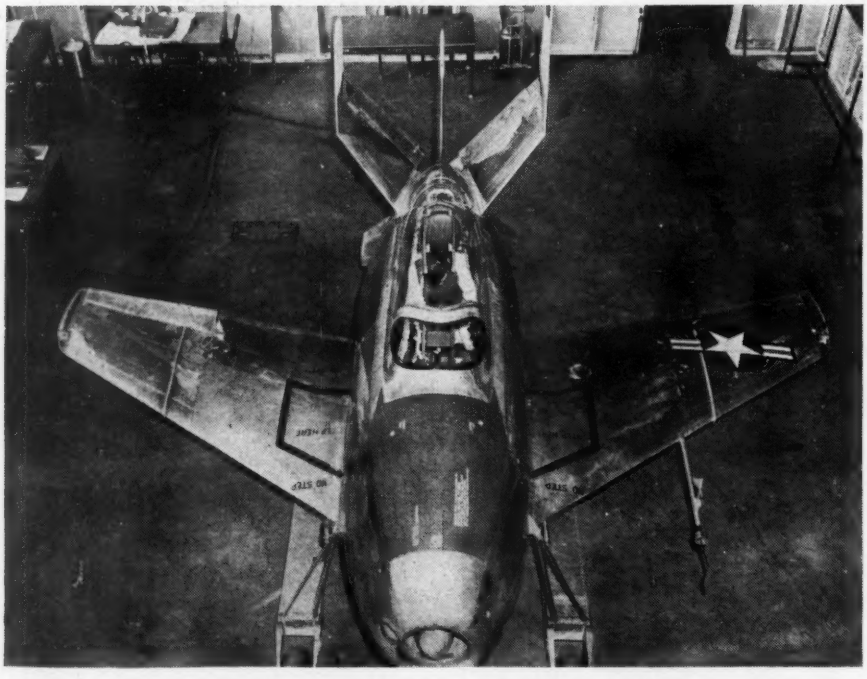
Symington indicated that all but 95 of the planes purchased with fiscal 1949 funds would be delivered before the end of fiscal 1950. He promised Congressional leaders that all of the funds made available would be spent during fiscal 1949. Included in the 1949 budget is a $10,300,000 item for production of guided missiles.

► **To Buy Tooling**–The Air Force offered a detailed breakdown on the additional $822,000,000 added by Congress to the original Presidential budget but claimed a similar breakdown for its entire procurement budget was still a military secret. Air Force officials explained that they had been obliged to compromise security of the supplemental appropriation to push their case before Congress.

Procurement of new planes will eat up 52 percent of the $822,000,000 with 21 percent earmarked for modernization of aircraft now in production. Tooling for additional production required in subsequent years by the 70-Group Air Force program will require 18 percent. In this connection Air Force Comptroller Lieut. Gen. Edward Rawlings reveals that sufficient tooling would be purchased for Boeing to boost B-50 production from its current 2-3 planes per month to a potential of 47 planes monthly. Subcontracting to avoid the expense of putting new plants into operation will take 9 percent of the additional funds.

► **1952 Deadline**–Symington emphasized that the new Air Force procurement program was merely the beginning of the five-year 70-Group program.





Parasite Fighter Readied for Fired Flight Drop

First photos of McDonnell XF-85 prototype now being readied for first flight drop from B-29 belly reveals quintuple tail fin configuration, final version of many tested. Special dolly is required because of absence of landing gear on the barrell-shaped craft. Westinghouse J-34 axial-flow turbojet engine develops 3000 lb. thrust and uses straight-through flow from nose to tail. Pilot sits atop engine in pressurized cabin. Odd craft is designed to fold wings and fit inside Convair B-36 bomb-bay. Service test quantity has been ordered for development tests. The hook which attaches the plane to the bomber retracts into a flush-sealed compartment in the top of nose. Sweep-back wings have a 21-ft. span. (U. S. Air Force photo)

Earliest deadline is the end of 1952.

Both House and Senate concurred in tacking renegotiation provisions onto the aircraft procurement bill and requiring quarterly reports from the Secretary of National Defense on the funds expended by the end of each quarter. As settled by a joint conference, renegotiation provisions now apply to contractors who do more than $100,000 worth of business annually from funds appropriated in this bill.

Turboprop XP5Y-1 To Fly Early In '49

Convair's XP5Y-1 45 ton flying boat (AVIATION NEWS, June 2, 1947), largest the company has ever undertaken and first in the world to be powered by turboprop engines, is slated to fly early next year. The radical new design features 400 mph. top speed, a takeoff duration of only 11 sec. and the ability to remain at sea for several days.

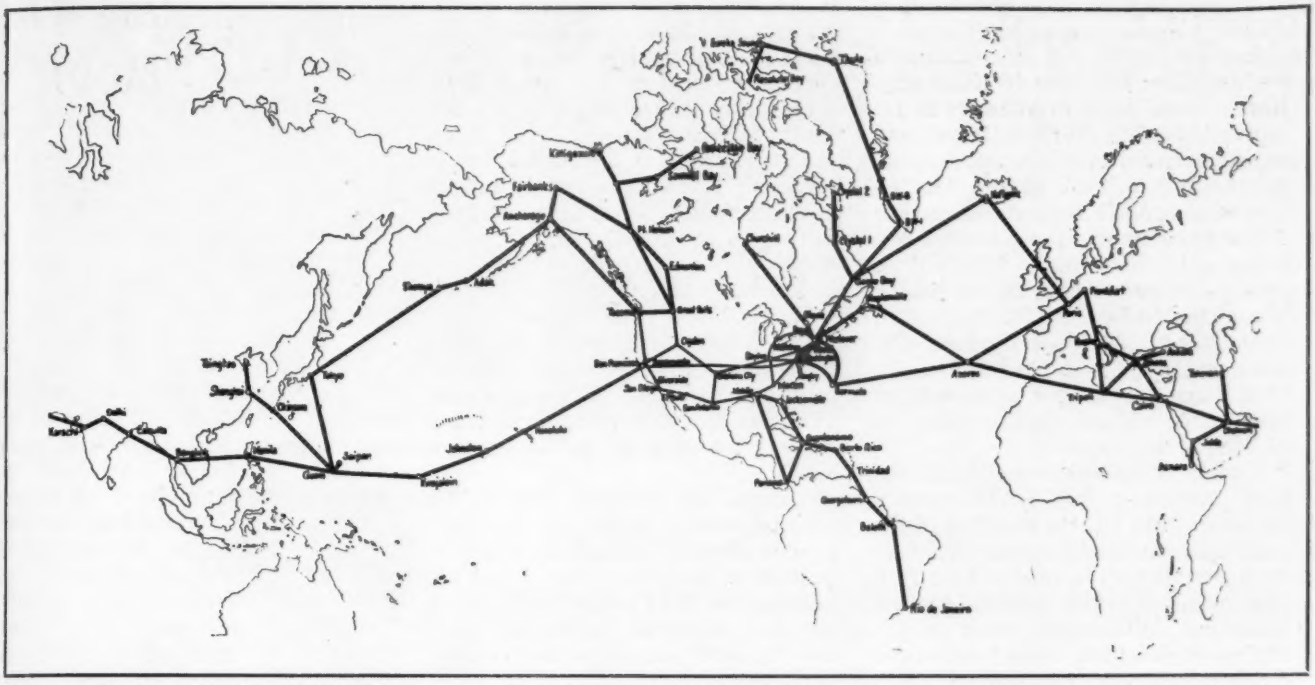
Distinctive feature of the XP5Y, in addition to its unique power plant, is its high length-beam ratio hull (long in proportion to width) which provides greatly reduced air drag while retaining satisfactory water handling characteristics. The interior has been especially designed to provide crew comfort for duties extending weeks at a time. Special equipment aboard includes a small gas turbine engine from which air pressure is bled to operate generators, providing electricity for cooking, heating, lighting, engine starting, etc. during periods at which the craft is moored at a distance from its base.

▶ **Allison-Powered**—XP5Y is powered by four Allison T-40 gas turbine engines developing 5500 hp. each. The new engine consists of two TG-180 basic units mounted in pairs and geared into a common propeller shaft. The engines are buried completely within the wing with only the propeller shaft housing extending forward a few feet from the wing leading edge.

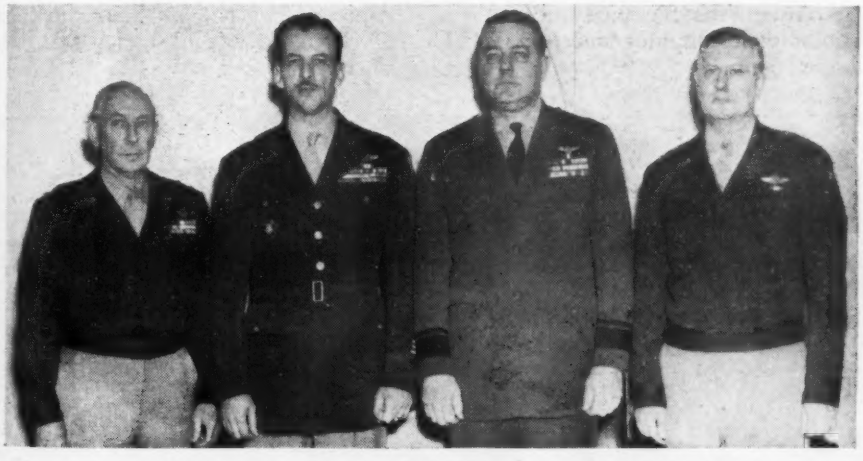
The use of scale models expedited preliminary design research on the XP5Y and will provide untold savings in manhours and money through eliminating the necessity for extensive changes in the prototype produced by early flight tests. The tiny scale models are radio-controlled, powered by four electric motors and duplicate the full-scale airplane not only in scale dimensions and shapes but in mass distribution, giving the model the exact dynamic characteristics in flight as is expected of the full-scale airplane.

Karant to AOPA

Aircraft Owners and Pilots Association is reported to be planning to publish a new magazine for private flyers, to be edited by Max Karant, former editor of Flying magazine, who has been appointed assistant general manager and editorial director of AOPA. The association, for the present at least, will continue its arrangement for publication of the AOPA Pilot, for its 40,000 members as a monthly insert in Flying. Karant will supervise this, the AOPA News and a monthly confidential newsletter to members, and will direct preparation of service bulletins to members.



From combination of ATC and NATS has come world girdling routes of MATS which on June 1 goes into action under direction of . . .



. . . the joint USAF-Navy team of McClelland, Kuter, Whitney and Tunner.

World's Great Transport System

Service to start with 215 four-engine planes, although Navy will retain more than 50 percent of its aircraft.

By ROBERT HOTZ

The Military Air Transport Service will begin operations June 1 as the consolidated scheduled airline for the National Defense Establishment and all other governmental agencies.

As the first practical test of armed forces unification, progress of MATS will be followed closely by Congressional leaders, commercial air transport industry and MATS' three principal customers, the Army, Navy and Air Force.

Principal functions of MATS, as specified last week by Defense Secretary James Forrestal:

- Operation of all scheduled air transportation over trunklines for the three military services and other government agencies; carrying on certain feederline and nonscheduled operations (non-tactical) and air evacuation of hospital patients.
- Provide global Air Force communications, weather service, air-sea rescue service and operation of all primary facilities required to provide these services.
- Maintain liaison with civil air transport to plan utilization of civil facilities during wartime; organize an air transport reserve and exchange information on such subjects as equipment maintenance procedures and technique.

MATS will not operate all military air transport. Biggest surprise of the agreement worked out between John Nicholas Brown and C. V. Whitney, Assistant Secretaries of the Navy and Air Force respectively, was the Navy's retention of more than 50 percent of NATS planes and personnel.

► **Navy Keeps Transports**—Navy will keep 45 of NATS 84 C-54s, both Lockheed Constitutions not yet delivered; the four Martin Mars flying boats now operating between the Pacific Coast and Hawaii and 3200 persons out of NATS total strength of 6200. The Air Force will retain 72 four-engined transports out of ATC's present 251.

MATS will begin operations with 215 four-engine transports, principally C-54s with a few Boeing Stratocruisers (C-97) and Douglas Globemasters (C-74). It will operate a globe-girdling route across the North Atlantic, along the North African littoral, through the Middle East to India and across China and the Pacific. North-south routes run from Thule in northern Greenland to Rio de Janeiro. MATS will operate an extensive route pattern in the Arctic, much larger than wartime operations in that area.

► **Navy Feederlines**—Navy will continue to operate feederlines branching from main MATS trunklines to areas used solely by the Navy. These feederlines will include runs from Samoa and Midway to Hawaii, east and west coastal routes in the United States, spurs to Guantanamo in Cuba and Argentia in Newfoundland. Both the Air Force and Navy will operate their tactical air lift

in support of fleet, air or ground force operation separately from MATS.

Initially MATS will be commanded by Maj. Gen. Lawrence S. Kuter with Rear Admiral John P. Whitney as his deputy. Maj. Gen. William Tunner will be in command of all transport operations with Maj. Gen. Harold McClelland heading MATS operational services including communications, weather and rescue and traffic control. MATS three transport divisions will be headed by Maj. Gen. Bob Nowland, (Continental), Rear Admiral Matthias Gardner (Pacific) and Brig. Gen. Archie Old, Jr. (Atlantic). Eventually it is planned to concentrate Navy participation in MATS in the Pacific.

▶ **Typical Consolidation**—Typical of early attempts at NATS-ATC consolidation in MATS is the handling of the crack transcontinental nonstop flights of both services. NATS operated the Hotshot six times weekly between Moffett Field and Washington while ATC's Statesman flew three times a week from Fairfield-Suisun to Washington. Both services operated at 100 percent load factor so they will be continued as a nine-flights-a-week MATS schedule using Air Force and Navy planes and crews. Washington terminal operations have already been consolidated at the former ATC National Airport Terminal. A study is now under way to determine whether Fairfield or Moffett will best serve the San Francisco area. When this study is completed the Pacific Coast terminals also will be consolidated.

▶ **Varying Efficiency**—One of the big problems in MATS will be determining the degree of economy and increased efficiency to be derived from the consolidation. NATS under the command of Rear Admiral John W. Reeves, Jr., produced operational statistics that indicated a far greater efficiency than the record offered by ATC. In many cases ATC was unable to produce statistics covering the same ground as those of NATS.

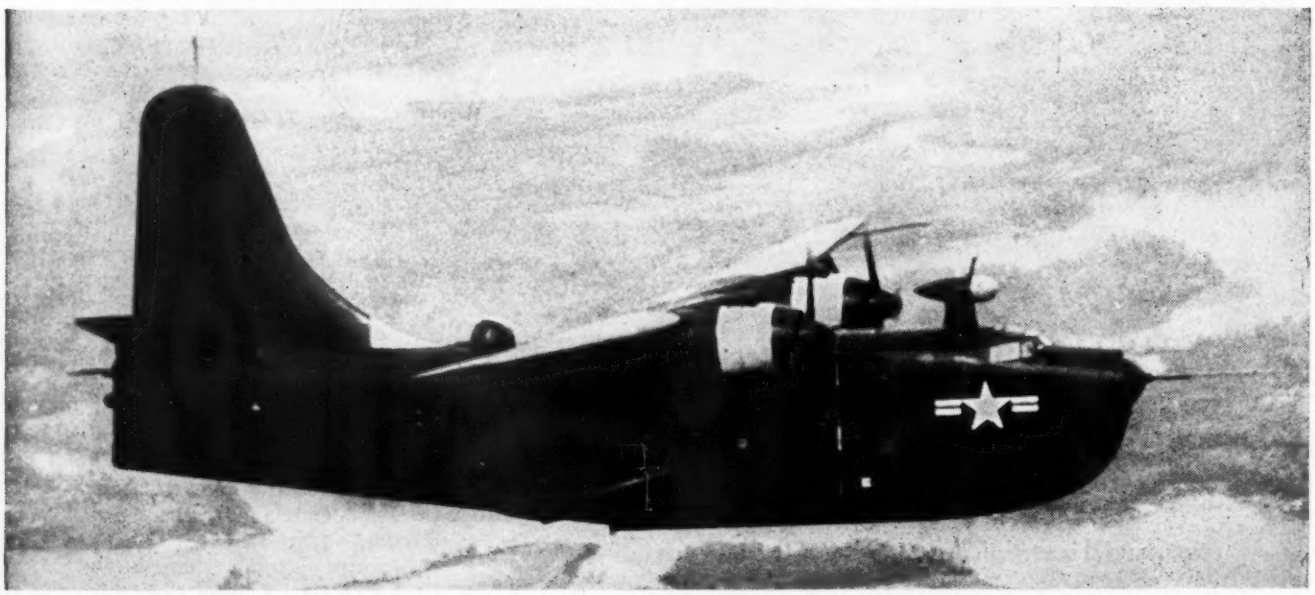
Forrestal has directed that MATS submit quarterly reports on its operations to afford a yardstick by which to measure its progress. Gen. Kuter has indicated the NATS statistical methods have been closely studied and will probably be incorporated in the management of MATS.

An air transport board composed of representatives of Air Force, Navy and Army will be the final arbiter on all inter-service disputes concerning MATS operations.

North American Wins Training Plane Work

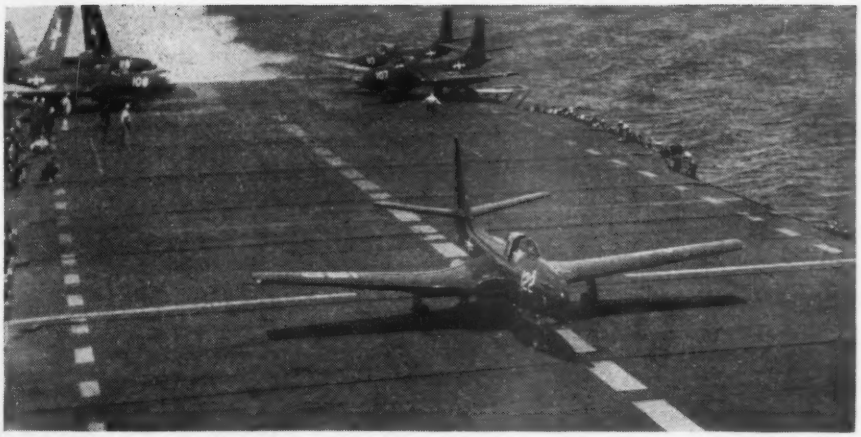
North American Aviation, Inc., has been declared winner of the Air Force training plane design competition and a contract for the purchase of the winning design is being negotiated. The 70-Group program will require nearly 2000 training planes. The two-seat craft features high performance and a wide range of utility covering primary, basic and advanced training duties. Top speed is about 300 mph, ceiling is 30,000 ft. and range is 1500 miles. It features retractable tricycle landing gear, large bubble canopy and carries complete voice-radio equipment for normal two-way conversational use.

Designs were entered into the competition by Douglas, Boeing, Beech, Bell and Fairchild and evaluation work has required months of effort to determine the winning point score. North American has remained in continuing trainer design and production since its formation in 1934. During the war it delivered 15,000 training planes to the Army and Navy and has produced 20,000 for U. S. and foreign customers since 1936.



Rigorous Test Program Ahead for Martin XP5M-1 After Completion of First Flight

Martin XP5M-1 has completed first test flight and is being prepared for a rigorous test program on its unusual planting tail hull configuration. In this design the hull planning surfaces continue to the extreme aft end of the airplane, providing rapid takeoff, smooth water handling characteristics and rough-water stability. Design of the hull accommodates a "tail down" landing in which the extreme tail of the airplane touches first with the hull being immersed progressively from stern to stem, thereby minimizing the dangers of "skipping" common to conventional flying boats. The XP5M-1 is basically a reworked Martin PBM but features added strength throughout the new hull to accommodate recently increased Navy flying boat strength criteria for rough water operations. The new hull design also provides improved aerodynamic qualities in flight resulting in increased performance. Conventional hulls provide drag-producing air turbulence in the vicinity of the step and lower after hull, which the new hull design eliminates. The XP5M-1 will be tested with newly designed sponson fuel tanks extending on either side of the hull at the water line to provide additional planning surface to accommodate the increased weight of the fuel. The sponsons are jettisonable in flight after consumption of their fuel. Powered by two Wright R-3350 Cyclone engines of 2700-hp. each, the new craft features increased internal area providing additional crew quarters, cargo stowage space and easy access to all parts of the hull. The inhabited area of the hull is fully insulated and includes heating and ventilating provisions. Increased galley facilities enable the crew to remain at sea for several days longer than the conventional flying boat. (Navy photo)



McDONNELL PHANTOM heads down the Saipan's deck in one of the 108 take-offs . . .

. . . and landings (nose high, arresting hook down) that showed practicality of carrier-based jets.

Phantoms Join the Atlantic Fleet

Navy Fighting Squadron 17A puts 24 FH-1s aboard in demonstration of successful handling of jet planes.

BY ROBERT McLARREN

ABOARD U.S.S. SAIPAN—The first jet aircraft carrier squadron in the world to complete qualification trials at sea, U. S. Navy Fighting Squadron 17A, has joined the Atlantic Fleet as an operational unit. Fully equipped with 24 McDonnell FH-1 Phantom twin-jet fighters, VF-17A completed 108 launchings and recoveries aboard the U.S.S. Saipan with the promptness and seeming routine operations of conventional propeller-driven craft.

The squadron thoroughly dispelled the last vestige of criticism concerning the problems of jet aircraft aboard carriers by proving most problems non-existent. Deck crews worked quickly and unconcernedly about the jet blasts with only normal caution, saying that propellers require a great deal more respect than jet streams.

Landing "waveoff" of jet planes has proved entirely normal and without difficulties. More than a dozen "waveoffs" were given Phantoms—resulting in rapid acceleration and a fast climb away from the carrier. Only concession to jet operation is an increase in the landing circle radius and altitude, the approach requiring considerably greater care by jet pilots than those flying conventional craft.

Landing signal officer duties are increased and waveoffs are more frequent, at least in this early stage of carrier jet operations. Tricycle landing gear with pencil-slim nose provides jet pilots with full and continuous view of the deck, unlike reciprocating engines mounted in the nose, which blind the pilot to the deck and force him to place full reliance on the landing signal officer.

▶ **Commander Killed**—The operation of 16 Phantoms (largest number of jet aircraft ever aboard a carrier) from the Saipan was marred, following completion of the trials, by the death of Cmdr. Ralph A. Fuoss, VF-17A squadron commander. While approaching Naval Air Station Quonset Point, R. I., two Phantoms collided in mid-air in the landing circle, according to witnesses.

The Phantom qualification trials were highlighted by the fact that the U.S.S. Saipan is one of the smallest carriers in the Navy with a flight deck only 73 ft. wide and 610 ft. long. Five unassisted takeoffs were made into a 35-knot wind with the Phantoms clearing the deck with ease. Deck catapult operations exhibited the speed with which a large number of jet fighters can be airborne from a carrier.

▶ **Models Vary**—The production FH-1 varies considerably from the prototype XFD-1 with additional fuel capacity, an increase in the two Westinghouse 19XB2B turbojet units to 1600-lb. thrust, flush wing air brakes, four .50-caliber machine guns in the upper nose, a new, high, square tail, large belly fuel tank (not used aboard carriers), longer fuselage and numerous detail refinements in the cockpit installations.

New Russian Jets

New data on Russian jet planes was revealed by Air Secretary W. Stuart Symington.

Quoting from USAF intelligence reports, Symington disclosed these Russian developments:

- Exact copy of the Republic P-84 Thunderjet, most advanced USAF jet fighter now in quantity production.
- Four engine jet bombers in the flight test stage.
- Swept wing jet fighter models that were successfully flown before similar USAF models were ready for flight testing.

Symington said there was no accurate data on the quantities of these planes the Russians had or were building. He quoted Air Force intelligence reports to indicate that the Russians were engaged in a tremendous aircraft production program and cited the testimony of Averill Harriman, former ambassador to Russia that:

"The only thing the Russians are afraid of is a great Air Force."

INDUSTRY OBSERVER

► **Latest Navy jet fighter, the Douglas F3D, made its first flight at Los Angeles Municipal Airport. This all-weather, long range fighter features twin jets in a belly installation. Pilot and radar operator are seated side-by-side.**

► North American has completed the XAJ-1, a Navy jet search plane designed primarily for anti-submarine work. It is expected to fly within the next few weeks. A production contract is in the mill.

► **Watch for a further cutback in Convair's B-36 order. Air Force has already reduced original goal of 100 giant six-engine bombers to 95, but the next cutback may slash production as low as 50. Air Force strategic thinking is now based on the ability of bombers smaller and less expensive than the B-36 to conduct shuttle bombing operations over a 6000-mile range. Most probable employment of B-36s now being produced will be as tankers to refuel several smaller bombers in midair on long-range operations. Range and cubic capacity of the B-36 make it a better long-range tanker than the modified B-29s now used for that purpose.**

► Top Air Force sources indicate that Convair's XC-99, long-range transport stablemate of the B-36, will spend most of its future at Wright-Patterson air base in an experimental test capacity, similar to the career of the Douglas B-19, world's largest bomber before the B-36 was built.

► **Twin-engine transports face a dim future in MATS operations. Responsible primarily for trunk-line service, MATS will rely almost entirely on four-engine equipment—the Douglas C-54 and C-74, Lockheed Constellations (C-121) and Boeing Stratofreighters (C-97). Military purchases of twin-engine transports will be made however, for the tactical air transport that both Air Force and Navy will operate in mobile support of combat forces and feeder line operations to supplement the MATS trunkline service.**

► United Aircraft and Westinghouse staged a bitter behind the scenes battle over possession of the war surplus Pratt & Whitney, Kansas City engine plant. Navy, who wants the plant as part of its standby program, backed Westinghouse with an eye to jet production. Issue was finally decided by recently created aircraft committee of the munitions board in favor of Westinghouse. Pratt & Whitney probably will be given the Lockland, Ohio, plant for reciprocating engine production under the Air Force standby program.

► **West Coast airframe manufacturers have been alerted by USAF to possibility that they may be called upon to perform extensive components production for the Boeing B-50 bomber. At latest report no contracts had been awarded on response of plane plants to query on their ability to perform if called upon.**

► Airplane and engine manufacturers running tests of turbojet and rocket engines continue to receive reports of "supersonic sickness" from persons working in close proximity to engines. Alleged reactions to supersonic vibrations vary widely. Grand Central Airport, Glendale, Calif., employes claim a "feeling of seasickness" after working beside turbojet and rocket test stands. Reaction lasts from one to two days with no apparently serious after effects.

► **Revival of strong interest in airborne and ground cargo handling devices may be expected as military air program develops. Trick methods for raising loads from ground to airplane deck level, and positioning cargo units within the plane, are on numerous drafting boards. On the West Coast two new systems will be ready for announcement within the month.**

► United Helicopters, Inc., has completed rotor vibration tests on its three-place Hiller 360 helicopter and within the month will begin CAA flight tests. Early initial production is sought at company's new Palo Alto factory, recently dedicated, and a flight training program for dealers and buyers is under preparation.

► **Canadian Pacific Airlines, subsidiary of the Canadian Pacific Railway, is ready to operate a trans-Atlantic contract for Trans-Canada Airlines for the ferrying of immigrants from Great Britain to Canada. CPA has bought DC-4M aircraft from Canadair, Ltd., Montreal, and will be assigned a contract for the immigrant passenger service by TCA, which recently cancelled the contract with Trans-Ocean Airways. While no official announcement has been made yet, this move is in line with the Canadian government's change in policy towards CPA to allow the company to operate scheduled interurban flights, and contract operations on another international route from Whitehorse, Yukon, to Fairbanks, Alaska. CPA parent company operates world-wide steamship services and has long endeavored to get into international aviation.**

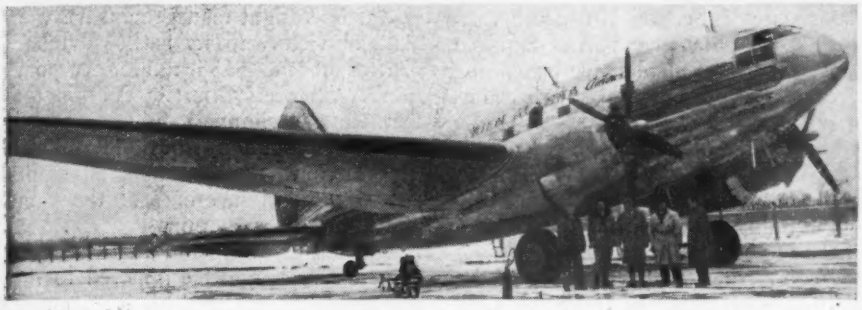
Accident Report

Continuation of the flight into instrument weather conditions over mountainous terrain at an altitude too low to clear mountains enroute probably caused the crash of a Slick Airways C-46 cargoplane 40 miles southwest of Hanksville, Utah, last Aug. 21, according to a CAB accident report. The three occupants of the plane were killed when it hit a peak 100 ft. below the crest at an altitude slightly over 10,000 ft.

AVIATION CALENDAR

May 18-20—AIA board of governors meeting, Williamsburg, Va.
May 19—Air Commerce Day at Miami, part of World Trade Week observance.
May 20—ICAO European-Mediterranean regional meeting, Paris.
May 23—Seventh annual national meeting, Society of Aeronautical Weight Engineers, Columbus, Ohio.
May 27-28—Third Annual Michigan Aeronautic Conference, Lansing, Mich.
May 28—ICAO legal committee, Geneva.
May 29-30—New England Seaplane Regatta (AOPA), Lake Winnipesaukee, N. H.
May 30—American Legion National Air Show, Berry Field, Nashville, Tenn.
June 1—ICAO second assembly, Palais Des National, Geneva, Switzerland.
June 1-6—Second annual all woman air show, Miami.
June 5-13—International lightplane tour of Italy, open to U. S. aircraft through National Aeronautic Association.
June 6-11—SAE Summer Meeting, French Lick Springs Hotel, French Lick, Ind.
June 7—Fifth annual personal aircraft meeting, Institute of the Aeronautical Sciences, Rackman Memorial, Detroit.
June 8-10—Airport Management Conference, College Station, Tex.
June 9—Fifth annual personal aircraft meeting, Institute of the Aeronautical Sciences, Hotel Allis, Wichita.
June 10—Fifth annual personal aircraft meeting, Institute of the Aeronautical Sciences, Engineers Club, Dayton.
June 11-13—Spring Air Cruise sponsored by Pennsylvania Aviation Trades Association, Williamsport, Pa.
June 14-15—Airlines Medical Directors Association, annual meeting, Royal York Hotel, Toronto.
June 16-18—19th annual meeting, Aero Medical Association, Royal York Hotel, Toronto.
June 17-18—Aviation Distributors and Manufacturers Association, Grand Hotel, Mackinac Island, Mich.
June 21-25—American Standards Association seminar by Dr. John Gaillard, Engineering Societies Building, New York.
June 21-25—1948 Annual meeting, American Society for Testing Materials, Detroit.
June 22-23—Annual Ohio State Aviation Clinic, Bowling Green.
June 27-30—Annual convention, National Aeronautic Association, Hotel Radison, Minneapolis, Minn.
July 2-9—National Air Tour Week, sponsored by United Pilots & Mechanics Association.
July 2-9—Second National Air Tour Week, United Pilots and Mechanics Association.
July 4-5—Annual National Air Show, Port Columbus, Columbus, Ohio.
July 14-15—Institute of Aeronautical Sciences' annual summer meeting and dinner, Hotel Ambassador, Los Angeles.
July 17-18—National Trading Day and All-Dixie Air Show, Chattanooga, Tenn.
May 25—ICAO Council, fourth session, Geneva.

ENGINEERING & PRODUCTION



MODIFIED, licensed and winterized, this C-46 goes from USAir to Wien Alaska Airlines.

Sales Mount on Converted C-46s

After considerable reengineering to get certificate, Buffalo firm has sold score of wartime transports.

United Services for Air, Inc., first to obtain a commercial certificate for modified C-46 transports, has sold about 20 of the planes, and is in the middle of an expansion program.

Aircraft purchasers include Wien Alaska Air Lines, Arctic Pacific Inc., Slick Airlines, Aviation Corp. of Seattle and others.

After two years of exclusive C-46 work, of which the first six months were in experimentation to gain the original type certificate, the company now points to the successful C-46 A and D modification and licensing under its specifications in type certificate 789 as granted by CAA.

"The licensing of aircraft has called for considerable reengineering of the original military version to rework it to a commercial configuration to adapt it to the airlines and air carriers", Henry C. Marquardt, vice president, told AVIATION WEEK.

▶ **Conversions for Cargo**—The average conversion of the company is used mainly for cargo. With 40 bucket seats, it has been used for passenger carrying. "Now, with our recent incorporation of additional fire prevention engineering," said Mr. Marquardt, "the C-46 is acceptable on today's standards for passenger or cargo use."

To insure continuous supply during this interim period, "and in the face of present world situations", the company recently purchased 25 surplus C-46s which will be offered for sale to the scheduled, non-scheduled and contract carriers. They will be modified and licensed by the Niagara Falls company. United Services for Air has declined to reveal the source of funds for the purchase, but maintains the planes were not bought on the basis of speculation.

To accomplish the licensing and numerous modification changes in the C-46, extensive tooling work was undertaken to fabricate all the needed parts. "This tooling has placed us in a very desirable position. As the type certificators of the C-46 A and D model, we now manufacture many of the parts for this aircraft," said the vice president, "including those in short supply and not available through surplus or normal procurement channels." USAir's parts business accounts for 35-40 percent of all revenue.

▶ **USAF Work**—He said considerable parts and components are being manufactured for the USAF and commercial interests. "While specialists in C-46 parts, we have diversified to accept other aircraft manufacturing work," he added. It is understood that the Air Force contract amounts to $300,000.

Originally located at the former 20-acre AAF Modification Center, Niagara Falls Airport, the company has recently acquired an additional site at Buffalo Municipal Airport.

▶ **Facilities Moved**—The company has moved all of its manufacturing, machine shops, tooling and fabrication work to the Buffalo plant to center all manufacturing of parts and components at that location. The new facility also affords work area for C-46 modifications. The base at Niagara Falls is used exclusively for modification and licensing of C-46 aircraft of which there are seven now being processed.

A third base was put into use April 1 at Palm Beach International Airport, West Palm Beach, Fla. to provide a central servicing point for certificated C-46s. It is convenient to all South American carriers and will be used mainly for the modification and licensing, overhaul and maintenance of C-46 aircraft and as a parts and service center. A portion of the 25 aircraft recently acquired by the firm are to be ferried to Palm Beach International Airport, Fla., for licensing.

As the present major supplier of new manufactured C-46 spare parts for the Army and commercial use, the company has obtained extensive spare parts through surplus facilities and other available channels.

▶ **Spares Offered**—These are being reconditioned and offered for sale to the users of the C-46 aircraft to meet their needs for several years. As a WAA parts agency, specializing in C-46 spares, this specialized service will be offered hand in hand with the company's own parts program.

To provide for lower cost modification and licensing, the company has adopted a "group plan" for licensing C-46 aircraft which was brought substantial economies not previously afforded in single aircraft modification, Mr. Marquardt said.

"By pooling individual customer orders to put them through our production in groups," he explained, "a minimum of five at a time, an economy of over 30 percent has been effected."

This group plan provides for the company's completion of the mandatory changes for cargo conformity under its specifications in CAA Type Certificate for a price of $20,610, and will include with this work the NC on the C-46 A or D for cargo in addition to the mandatory changes.

The company will complete the airworthiness work, exclusive of the airworthiness parts cost, to afford an NC flyaway on the customer's aircraft at $24,595. The company reserves the right to hold this offer only on aircraft acceptable to it for licensing.

Mr. Marquardt said approximately 350 C-46s are in WAA surplus fields, many with a total hours less than 300, many more with engine hours below 100 since new or since overhaul, and the balance with less than 1000 airframe hours, affording "exceptional conversion material."

George to Hughes Aircraft

Lt. Gen. Harold L. George will become vice president and general manager of Hughes Aircraft Division of Hughes Tool Co. June 1. The office has been held for two years in acting capacity by Frank M. McDonnell, Hughes Aircraft treasurer.

Following World War II service as commanding general, Air Transport Command, and retirement Dec. 31, 1946, George was president and general manager of Peruvian International Airways.

Boeing Strike

Gets involved in suits for damages and interpretation of Taft-Hartley labor law.

The strike of the Aeronautical Mechanics Union against the Boeing Airplane Co. at Seattle, Wash., became a matter for legal interpretation last week, as the company filed a $2,250,000 suit against the union and Boeing President William M. Allen refused the demand of U. S. Conciliation Director Cyrus Ching that the company enter into talks with the union. Allen said the meeting would violate certain sections of the Taft-Hartley Act.

After Allen had declined his first invitation, Ching pointed out that the Taft-Hartley Act provides that employers and employes shall participate "fully and promptly" when directed by the Federal Mediation and Conciliation Service. Allen, repeating his refusal, contended the section of the act cited by Ching was not applicable because "this strike is in violation of Section 8-D, the National Labor Relations Act, which removes the collective bargaining rights of its striking employes." The meeting Ching proposed therefore "would render meaningless the section of the act which protects an employer who is the victim of an illegal strike."

Ching's policy, Allen said, would require the company to bargain with its "illegally striking employes."

▶ **No Meeting**—Ching had requested that representatives of Boeing and of IAM meet in joint conference with Federal Mediation and Conciliation Service at Washington, D. C. Allen declined to attend if the purpose of the meeting were "to bring the parties into collective bargaining negotiations," but offered to send representatives "for the purpose of giving those present complete facts in support of our position that the strike is illegal."

Union representatives had accepted Ching's invitation.

Earlier in the week, Boeing filed suit in federal district court at Seattle, seeking $2,250,000, strike damages from Aeronautical District Lodge 751 and IAM. The action charged the local and its international with causing and sanctioning a strike of more than 14,500 members in Boeing's Seattle plants while a contract containing a no-strike clause was in full force and effect.

The strike has crippled production activities on more than $300,000,000 worth of military and commercial contracts.

▶ **Basis of Suit**—"We have repeatedly stated that the Union officers did not act in the interest of employes in calling this illegal strike," Allen said. "Nor did they consult the employes as to the advisability of doing so. By breaking their contract and calling the strike the Union has caused great damage to company and employes alike. The company now seeks to recover some of these damages by court action."

Authority for the action, the complaint states, is Section 301 of the Taft-Hartley Act which gives parties damaged by a violation of a collective bargaining agreement the right to take their claims to Federal Court.

Meanwhile, members of a committee named by Seattle Mayor William F. Devin reported they have been unable to find a basis for company and union officials to reopen negotiations.

▶ **Union Action**—Following filing of the company suit, Attorney L. Presley Gill, representing the union, said he would file two damage suits, and a libel and slander suit against the company. The suits would seek to enjoin the company from firing employes, require the company to bargain with the union, and ask $163,000 for every day of the strike (loss of wages), $140,000 for strike benefits from IAM, and additional sums to include the cost of picketing and other expenses in maintaining the strike.

A libel and slander suit would be based on the company's newspaper ads which accused the union of violation of contract and unfair labor practices, Gill said. Total sum of the suits will be for $5,000,000.

The company paid out more than $2,500,000 in back pay and vacation pay to the striking employes May 5. In a letter accompanying the checks, the company pointed out that the employes have, under the law, lost their status as employes for purposes of collective bargaining but did not issue termination slips or require the return of employe buttons. The company is keeping in force, life, health and accident insurance policies through the month of May.

T-H Angle

The Boeing strike raises the first test of a little-noticed part of the Taft-Hartley labor law: Section 204 (A) (3) requiring parties to a dispute to participate in conferences called by the Federal Mediation and Conciliation Service.

Boeing President Allen, declining to attend a conference summoned by FMCS Director Ching, stood on Section 8 (D) of the law which requires 60-day notice to the other party, and 30-day notice to FMCS of proposed contract changes. Ching replied, directing attention to Section 204. Boeing demurred; Ching now is pondering the next step.

C-W Control

Management victor in first court test but opposing side still claims voting majority.

Curtiss-Wright management has won a major victory in its battle to retain control of the $135 million corporation. A Chancery Court in Wilmington Del., in a preliminary injunction prohibited a common stockholders committee from reconvening "any purported recessed meeting" of the company's annual gathering.

Previously, T. Roland Berner, chairman of the committee opposed to the management, indicated his intention of conducting this stockholders' meeting on May 7. Based on this court action, Berner announced that this meeting will now be recessed until "the second Tuesday after the date of any order Chancery Court may issue vacating the injunction."

The validity of the meeting conducted by President Guy W. Vaughan, however, remains in doubt as the judge refused to pass on that question.

▶ **Dispute Not Over**—Considerable legal maneuverings appear indicated with no clear-cut determination as to the position of the various parties involved.

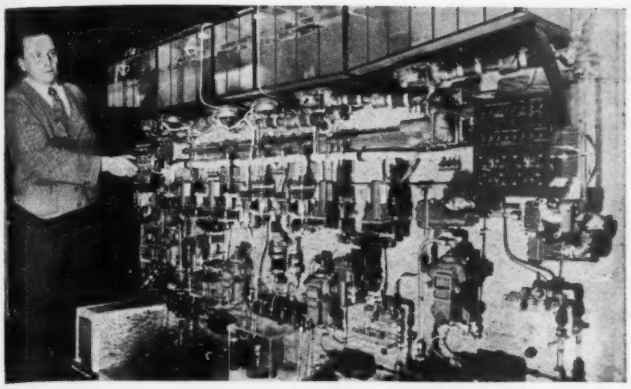
The court hearings last week brought out additional charges and countercharges.

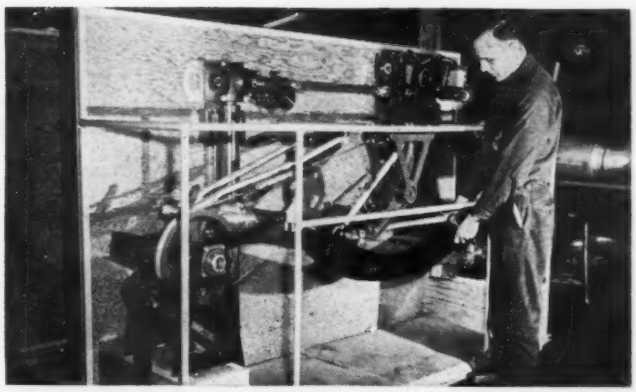
In cross-examining Vaughan, Berner brought up his attempt to examine the books. When Berner asked why he didn't get the records, Vaughan replied, "I don't think you were quite the athlete it would have taken to get them."

▶ **Proxy Holdings**—Berner now asserts that he has proxies for between 4,000,000 to 5,000,000 shares but has not had time to segregate those received since the meeting. The management group introduced as evidence proxies for 4,294,313 shares. No indication, however, was available as to how many of these proxies might have been revoked by those held by the Berner group, or when they were received.

The court action by a group of stockholders, presumed to be favorably inclined toward the management, is evidently designed to give validity to the meeting conducted by Vaughan at which his slate of eleven directors was elected. Until this question is resolved, it is believed that the Berner forces will continue to press their battle to have their proxies accepted in evidence and counted.

Observers believe that the offer of a cash distribution of $7 per share for the common shareholders has attracted considerable support for the Berner committee and a count of proxies at this time might be different to that on Apr. 21, the date of the annual meeting which is now in dispute.





Left: Boeing B-50 fuel system mockup includes all essential units, operating as in actual craft. Right: Landing gear and wing flap unit.

Mockups of B-50 Built to Train Crews

Wartime training method continued in units duplicating main systems of new bomber. Nine now in operation.

Aircraft system mockups—so effectively demonstrated as operational and maintenance training aids during the last war—are being used by the Air Training Command to facilitate schooling of B-50 crews.

Boeing Airplane Co. is supplying two sets of these devices, described as the most elaborate training units ever built for the USAF.

First group of nine units (each set consists of 21) is already set up at the Air Force's first B-50 school at Davis-Monathan Air Base, Tucson, Ariz.

When all units are delivered, they will be flown, in turn, to all air bases where B-50s will be stationed.

▶ **Fuel System Mockup**—This installation is mounted on a 5x7¾-ft. plywood panel, and includes all essential parts of the system. Lines are greatly shortened, made of Plexiglas so fuel flow can be observed. Tank models are also of Plexiglas.

▶ **Hydraulics**—All parts on the hydraulic panel are full-size, with exception of the rudder, and operate at B-50 system pressure. The model rudder is only one-fourth the size of the actual unit, but has the same angular travel.

On all panels, parts such as the rudder, which are working facsimiles, are painted black to distinguish them from actual units.

On the hydraulics unit, mechanics will learn to adjust and service the actual nose wheel steering mechanism, brakes, rudder boost control, camera door, and windshield wipers.

On the landing gear and wing flap unit, they will learn to adjust and rig the nacelle door actuators and regulate flap limit switches.

▶ **Electrical**—Another "live" mockup is the electrical power unit, designed to afford training in the proper method of balancing the power load between generators, and regulating all power loads for both a.c. and d.c. current.

▶ **Extinguisher, Anti-icing**—Also completely operative is the fire extinguisher system panel, embodying a setup which utilizes red lights to simulate fires. Proper operation of the system will extinguish the "fires."

The thermal anti-icing trainer uses red lights too, simulating heaters. On it can be learned the proper methods of heat control, and maintenance of equal temperatures in each wing.

▶ **Auxiliary Power**—This unit incorporates the actual B-50 internal combustion auxiliary power plant, complete with controls. Secondary to its use as a trainer, it can serve as the power source for all the other training units.

Another mockup comprises the complete bomb door system and all controls, both normal and emergency.

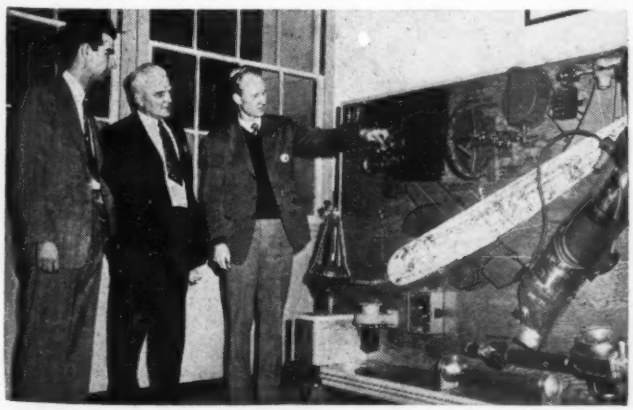
▶ **Weight and Balance**—A particularly ingenious setup is the weight and balance trainer, a scale silhouette of the B-50, pivoting on a fulcrum.

Weights simulating crew and fuel and bomb load can be hung on the fuselage, to demonstrate proper method of loading the plane and determining the center of gravity.

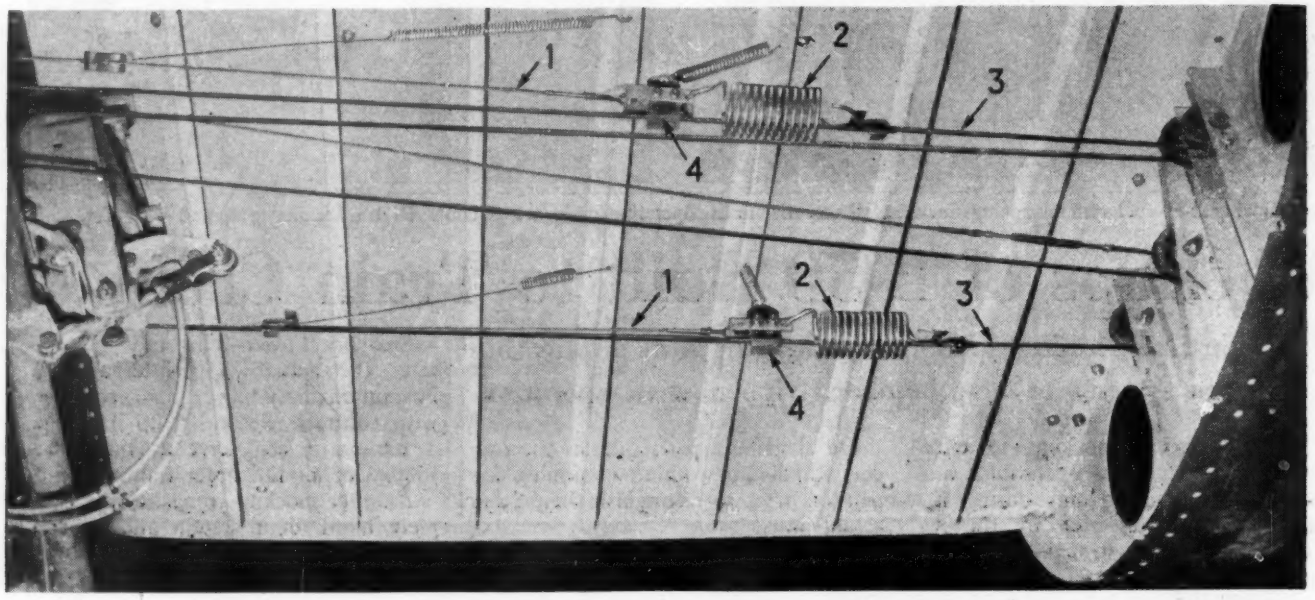
▶ **Automatic Pilot**—Complete operating techniques, adjustments and maintenance of the automatic pilot can quickly also be demonstrated on another trainer. Units of this system are mounted on a scaled-down model of the B-50. By manipulating the controls, the model can be made to turn, pitch, or roll in the same manner as the craft.

This action is accomplished by small electric motors, screws, and gears electrically actuated by the gyro stabilizers.

Sighting station, turret, and Fluxgate compass trainers are also operative.



Mockup panel (left) simulates heating and oxygen installations. Right: Hydraulic system operation is demonstrated to Air Force crew.



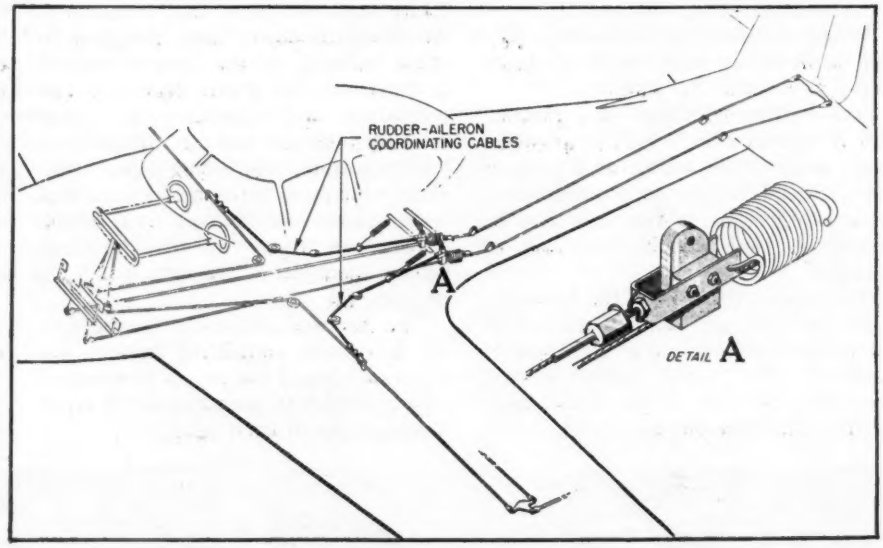
Navion's Selective Two-Control System

Basic principle of the selective "two-control after takeoff" system on Ryan Aeronautical Co.'s Navion is an interconnected aileron and rudder control. This permits flying with wheel control only, or using the conventional three-control system by employing the rudder pedals in normal manner.

Advantage of this automatic coordination is that while the two-control "wheel-only" system is claimed to be simpler and more relaxing, the arrangement gives additional safety and full control of the rudder when desired. Rudder pedals become effective by slight pressure on the spring-loaded interconnected hookup.

This extra directional control is particularly useful for takeoffs and landings involving operation from rough fields, and in crosswinds. It is also general practice to use the rudder during climb immediately after takeoff, for light torque effect or in particularly turbulent air. Connection between ailerons and rudder is so arranged that when force is applied to the wheel to move the aileron surfaces for banking to right or left, a limited movement of the rudder will be automatically accomplished to make a coordinated turn.

Same coordinated effect is obtained by using the rudder pedals during normal three-control operation, that is, there is limited movement of the ailerons to properly bank the plane. In using the rudder pedals, however, coordination effect is less pronounced than in the case of the ailerons.



Coordination system includes two cables and spring assemblies, interconnecting the aileron and rudder cables. At the rudder cable end of each coordinating cable (1) is a large coiled spring (2), through which the rudder cable (3) passes. A fairlead (4), secured to the coordinating cable and sliding over the rudder cable, prevents the spring from riding on the rudder cable.

Light tension springs take up coordinating cable slack which exists under certain conditions. Steel balls, swaged onto the cables at fixed position, provide the interconnecting points, except at the aft ends of the coordinating cables, where threaded fittings connect to clips which in turn, serve to engage the large springs.

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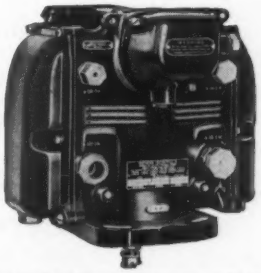

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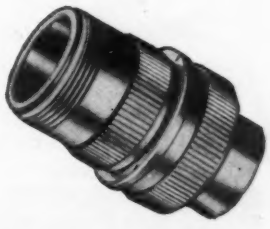

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EXPERIMENTAL single-place 'copter features coaxial contra-rotating configuration . . .

. . . carried over to Bendix Helicopter's five-place 450 hp. rotary wing craft.

Coaxial Design Promises Success

Torque-free configuration that has often been tried and dropped, yields results for Bendix Helicopter.

By IRVING STONE

Basic development of its coaxial contra-rotating rotary wing configuration has virtually been completed by Bendix Helicopter, Inc.

This design is embodied in two models, a single-seater (Model K) and a five-place craft (Model J), which were recently demonstrated to AVIATION WEEK, at Stratford, Conn.

Essential features are claimed to include very low vibration level for this type of machine, greater useful load, and improved maneuverability.

▶**Model K Details**—After preliminary research and tests, the experimental program began early in 1945. In June of that year the first flight was made with the single-place 'copter, having a 25-ft. rotor diameter, and powered with a horizontally installed Continental engine producing 92 shaft hp. Vertical spacing between rotors is 2 ft. 4 in.

This craft has now completed over 100 hr. of flying time. It still serves as a flying test stand on which refinements receive initial trial.

▶**Model J Makeup**—The five-place helicopter has a 48-ft. rotor diameter and is powered with a P&W 450-hp. engine displaced 14 deg. from the vertical axis. Rotor spacing is 4 ft. 6 in. The craft was designed and built using ANC standards and in accordance with CAR-06 specifications.

Two of these Model J 'copters have been completed and test flown. A third machine of the series is practically completed.

▶**Design Benefits**—Advantages in coaxial contra-rotating rotors are claimed to have accounted for an appreciable increase in lifting performance. As a result of flight tests, basic data on thrust and power required, converted to standard conditions, has indicated a gain in thrust over a single rotor averaging six percent from aerodynamic advantages alone. The gain is explained by these considerations:

- 1. Elimination of the rotational velocity in the induced flow field.
- 2. Greater air mass flow for a given nominal rotor diameter.
- 3. Other secondary effects caused by the oscillating flow field and reduced tip loss.

Since this type of helicopter requires no tail rotor, it is estimated that a saving of eight percent in power is available for lift.

It is also estimated that for each one percent gain in total lift or gain in total power available, a gain of three to five percent in useful load is realized, if space and supporting structure is available.

On the other hand, the gain in power available may be used for increased performance.

It is felt that compactness of the fuselage for the coaxial arrangement allows for efficient design of needed structure, so that fuselage weight need represent only a small part of the gross weight.

▶**Maintenance Access**—The machines have been designed with emphasis on ease of servicing and maintenance.

On the five-placer, for example, removal of the tailcone by disengaging four wing nuts exposes the engine, clutch, universal joint, and transmission.

Components of upper and lower rotors are largely interchangeable (about 90 percent) and all blades are identical. (Blade construction features a laminated birch spar extending to about 30 percent chord, and a plywood covering. The stainless steel leading edge is bonded on.)

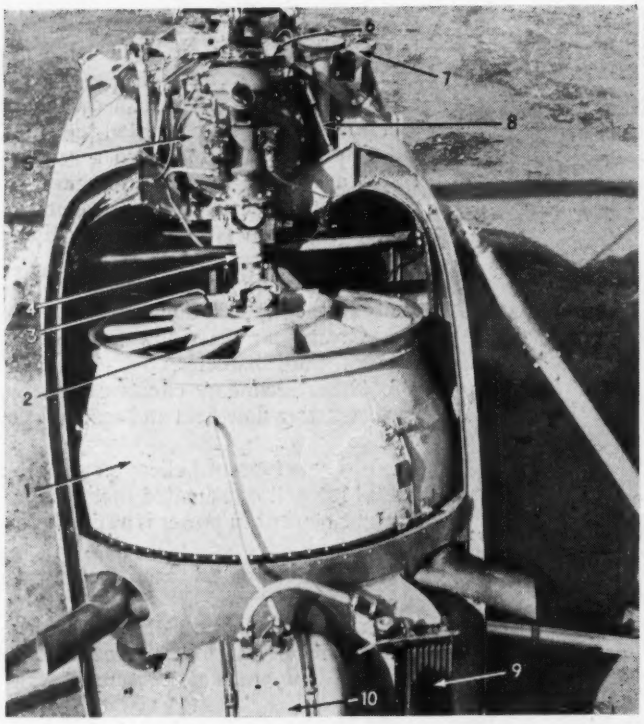
Hangar space is reduced to a minimum because the craft can be stored with its two-bladed rotors aligned fore and aft over the fuselage, giving it an overall width of 12 ft.—that of the landing gear.

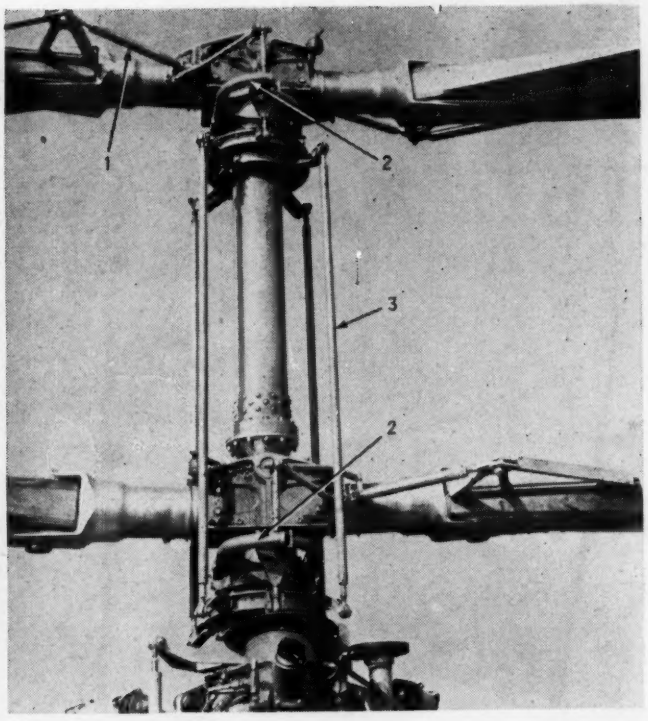
▶**Segregation of Controls**—Since torque reaction is automatically neutralized between the rotors, there is no interrelated effect of one control action upon another.

Thus, a change of pitch upward or downward does not require coordinated application of rudder; and vice-versa.

The troublesome effect of pitch change related to lateral control is also avoided.

According to Robert B. Gorrill, company chief test pilot, quick stops and starts, jump takeoffs, sharp pullups, and all similarly abrupt maneuvers are sim-





Left: Removal of tailcone on five-place craft affords easy servicing access. Details are: 1, Engine shroud; 2, fan (fastens to clutch casing, which turns with engine); 3, mercury clutch located in fan well; 4, universal drive shaft; 5, transmission; 6, single disk rotor brake; 7 and 8, suspension system torsion unit and link, respectively, between transmission housing and fuselage frame; 9, oil cooler; and 10, oil tank. Right: Coaxial rotor installation: 1, Blade drag strut; 2, blade angle change arm; and 3, connecting rod between the upper and lower swashplate units. Blades have laminated birch spar to about 30% chord, plywood covering.

plified and easily accomplished. Control about any normal axis involves the use of only one control motion.

With the five-place model, most flight testing has been conducted at the normal gross weight of 5400 lb., but with the reserve of power available, it is claimed that tests have been made with a gross of 6200 lb.

▶ **Cabin Enlargement Possible**—Fuselage redesign study is currently underway to increase the cabin size and change the seating arrangement to produce a six-place machine while retaining the present rotor size and power plant.

With its large cabin space, the Model J offers utility both for military and commercial use. Equipped with hoist and lateral litter supports it will be adaptable for rescue operations.

▶ **Vibration Factors**—In the single-placer's fuselage and controls, vibration is considered sufficiently negligible even though no isolation is incorporated. The construction is metal-to-metal throughout, and the push-pull control system has no irreversibility or friction devices to eliminate transmittal of vibratory impulses to the controls.

The craft has been designed this way to determine the various vibratory forces at specific points and then to eliminate these forces by appropriate insulation.

Scaling up of a small machine to a much larger model brings added vibration problems because the effect of aerodynamic and inertia forces increases in more than direct relation to the dimensional increase.

▶ **Suspension System**—In the five-place model, the vibration problem is minimized by incorporation of a novel rotor suspension system to disassociate the rotor-transmission mass from the fuselage-engine mass. The installation is claimed to effectively solve the problem at its source by freeing certain restraints.

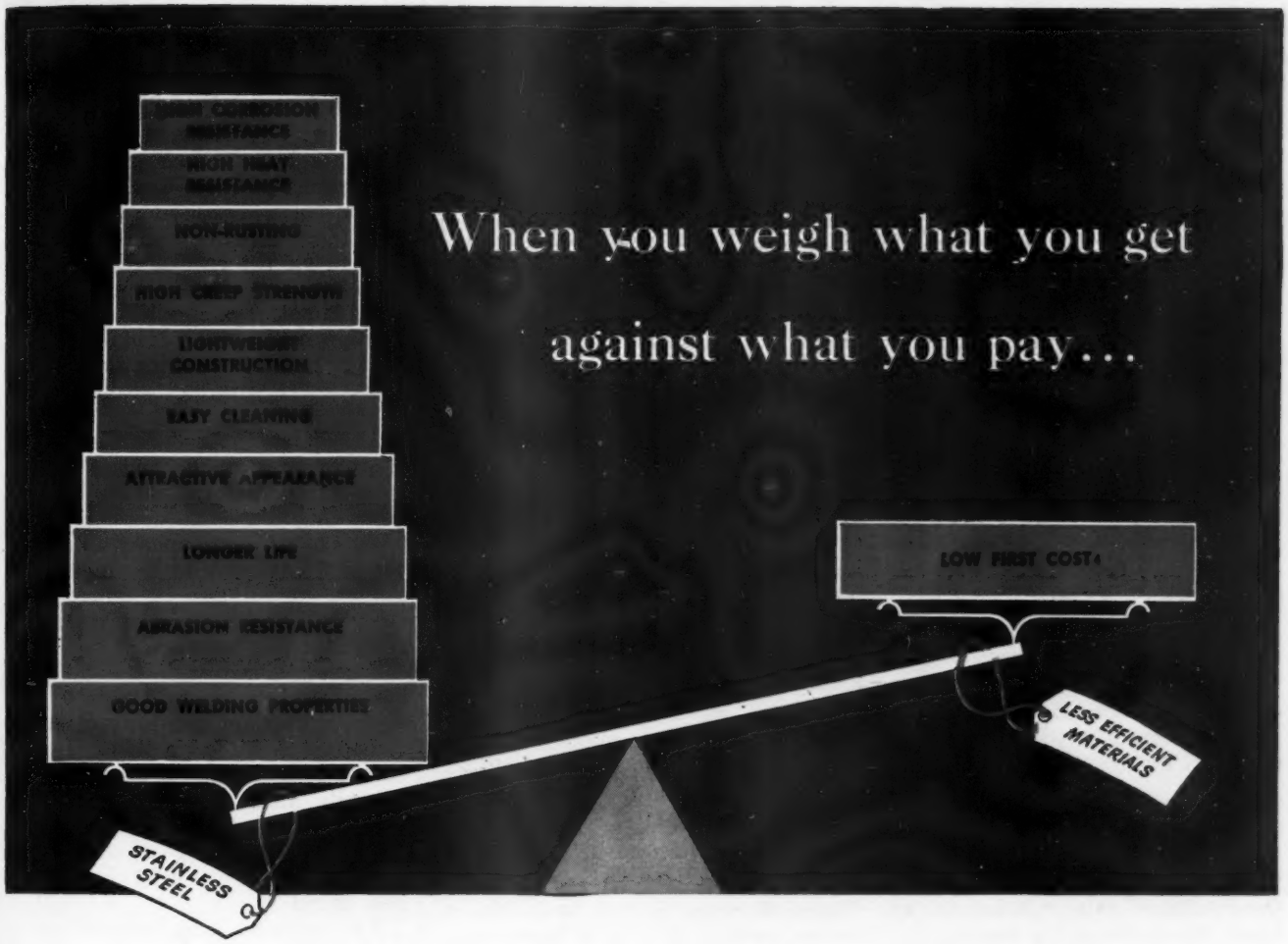
The suspension system utilizes four rods or links spaced 90 deg. apart, and carrying Heim bearing ends, connecting transmission housing to fuselage. Three torsion units (embodying Lord mounts) spaced 120 deg. apart also connect transmission to fuselage.

The links, whose axes would converge to the center of gravity of the rotor-transmission mass, allows free movement of the latter, while the torsion units snub and stabilize the link action.

▶ **Flapping Controlled**—The see-saw rigid two-blade installation employs no drag hinges. Blades are equipped with a centrifugal stop mechanism which engages and disengages automatically at approximately 50 percent of normal

Fundamental Data

	Model K (Experimental)	Model J (Production)	Model L (Contemplated)
Hp. available for takeoff, S.L.	92	450	178
Gross Weight, lb.	1250	5400	2003
Weight Empty, lb.	954	3600	1270
Useful Load, lb.	296	1800	733
Range, mi., 65% power, S.L.	85	270	300
Duration at cruising, hr.	1.1	3.15	3.15
Cruising speed, mph., 65% engine power	70	85	90
Maximum speed, mph., S.L.	96	112 (calculated)	110
Hovering Ceiling, ft., out of ground effect	2000	4500	3000
Service Ceiling, ft. (calculated)	8500	16,500	15,500
Rate of Climb, fpm., vertical, S.L.	350	750	450
Rate of Climb, fpm., at best forward climbing speed	900	1250	1000
Fuel Capacity, gal.	6	100	45
Oil Capacity, qt.	5	8	3
Disk Loading, lb./sq.ft.	2.54	2.98	2.84
Power Loading, lb./hp.	13.6	12.0	11.3
Rotor Diameter, ft.	25	48	30
Length overall, ft.	25	48	30
Width, ft., L.G. tread	6⅓	12	8
Height, ft.	9¾	14¼	11
Ground rotor clearance, ft.	6½	9¾	7 1/12



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In structural parts and control surfaces, too, U·S·S Stainless Steel will out-perform other materials. Aileron struts—rudder, elevator and stabilizer frames—fuselage skeletons and wing spars, can be built very strong and yet very light with U·S·S Stainless. Its high corrosion resistance eliminates the need for protective coating . . . no allowance need be made for weakening by corrosion . . . full strength will be maintained indefinitely. Fast fabrication by spot welding—20 to 100 times faster than riveting—lowers assembly costs.

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rotor speed. This allows control of flapping during starting and stopping and restricts blade movement while the craft is in a static position.

With this configuration and rotor mounting, it is claimed that ground resonance has not been encountered.

► **Throttle Operation**—Cockpit controls are conventional except for the throttle. This lever occupies the conventional position on the end of the collective pitch lever. However, it functions in an arc in the plane of operation of the collective pitch lever instead of with a twisting motion, removing the ambiguity associated with the twisting type of throttle control.

Any upward motion of either or both levers increases power, and any downward motion decreases power. In emergency conditions, this simplification of operation technique removes an item of potential confusion to the pilot. The throttle control may be moved separately to adjust for varying conditions of flight.

Speed attained with the five-place model has been up to 85 mph. It is expected that on the basis of power available and blade tip stall consideration, top speed of the craft will be relatively high.

A two-place machine, Model L, is now planned, based on experience gained with the two helicopter models now flying.

The company is an independent organization, in no way connected with Bendix Aviation Corporation.

Rotor-Craft Tests Copter

Test flights of the West Coast's first experimental tandem rotor helicopter, developed by Rotor-Craft Corp., are scheduled to be resumed this month at Grand Central Airport, Glendale, Calif.

Under construction for 2½ years as an Air Force experimental project, the rotary wing craft carries a pilot only, has a rotor diameter of 18 ft., and is powered by a 110-hp. Continental engine. Rotor blades, three per rotor, are mounted in rigid fashion to the driving hub.

Gilbert Magill, Rotor-Craft president and designer of the helicopter, anticipates full performance flights at an early date. Although the copter has been subjected to several tethered and hovering flights during the past year, no maneuvering flights have been attempted. Several structural weaknesses were discovered, and have been corrected during the past few months.

In anticipation of final Air Force tests, Rotor-Craft Corp. has moved its Los Angeles headquarters to 1204 Airway Drive, Glendale, at Grand Central Airport.

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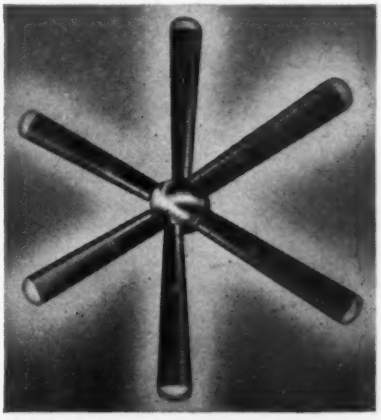
Next Flight—Tomorrow, Maybe

Flight schedules go up in the air when airplanes don't—which explains one phase of the preference for Aeroprop. Because of its unit construction, maintenance, repair and replacement time is cut to a minimum. It is installed as a unit, without special engine or airplane fittings. A single blade or the entire propeller can be replaced in a matter of minutes. Eliminating "extras" simplifies service, inspection and aircraft design.

Aeroprop performance fulfills the promise of these design advantages. The completely self-contained hydraulic operating principle is simple, contains few moving parts, and pays off in propeller reliability.

These proven Aeroprop principles apply equally well to Dual Rotation. The same hollow hub, self-contained hydraulic system, regulator and governor supply the correct answers to Dual construction problems.

As the aircraft of the future takes shape on your drawing boards—and as the problem of greater propellers for larger power plants presents itself—let Aeroproducts work with you on the job. As in the past, tomorrow's propeller problems are being solved at Aeroproducts today.



This is the Aeroprop—Available in single or dual-rotation with instant-feathering, reverse pitch, electric de-icing, and all other features required for any installation. Regulator, hub and blade assemblies are designed for unit installation or replacement. It is strong, light and simple.

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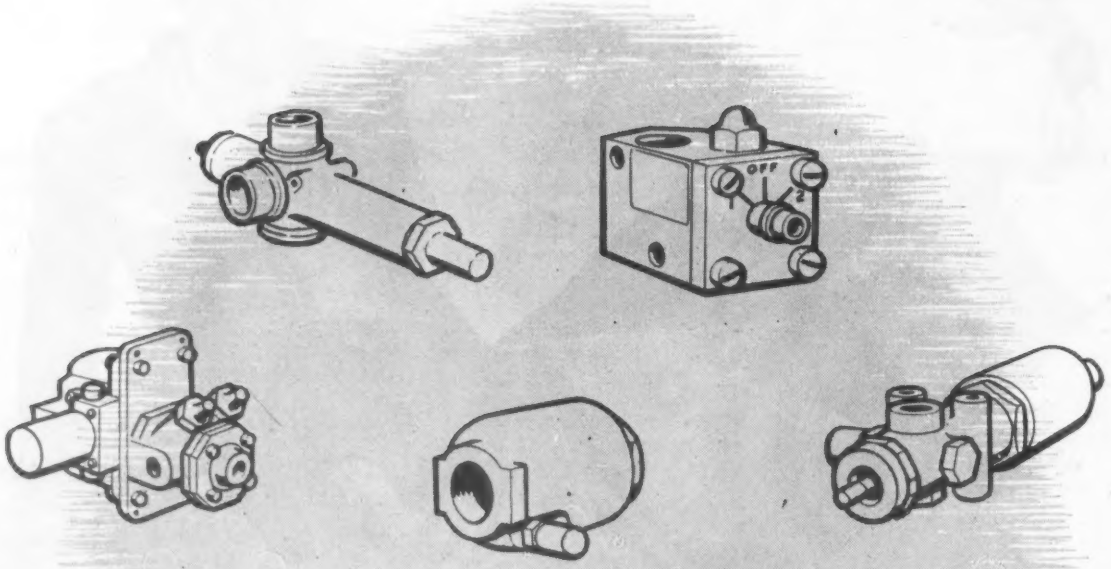

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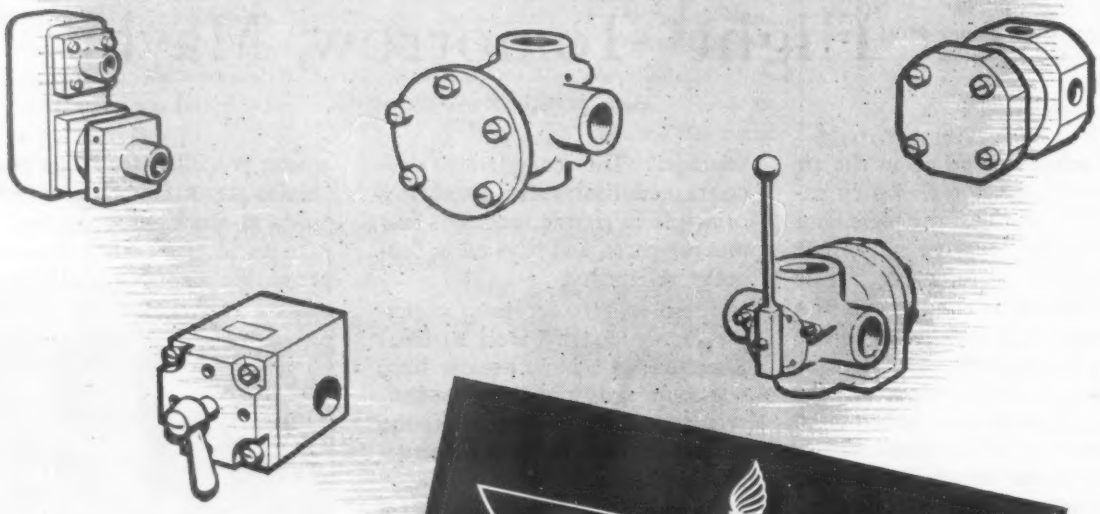

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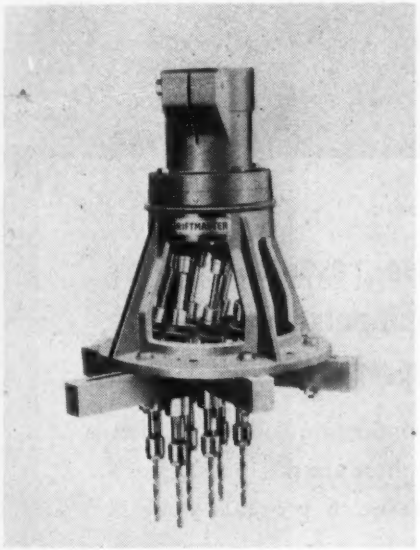
Lightweight Bearings

Light and compact bearings, for use in thin-walled housings, large diameter shafts where load is such that extremely high carrying capacity is not required, and in instrument or actuator design, are announced by **Federal Bearings Co.**, Poughkeepsie, N. Y. Produced in sizes from 1⅜ to 10 in. bore and from 2 9/16 to 13¼ in. o.d., units are fabricated from SAE 52100 steel and are stated to be capable of taking substantial thrust and heavy radial loads.

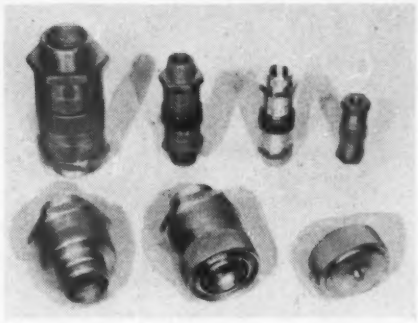


Adjustable Drillhead

Applicable to machine shop phases of aviation production is adjustable, multiple spindle drillhead with universal joint drive, made by **Thriftmaster Products Corp.**, Lancaster, Pa. Full ball bearing mounted, device is stated to feature flexibility of operation, strong construction, and high overload capacity. Furnished with 2-6 spindles, minimum 1⅛ in. center spacing within 6¼ in. dia. circle, unit is made for right-hand rotation of drill press.

Supports Lathe Work

To facilitate lathe operations, follower and center rests offered by **South Bend Lathe Works**, 157 East Madison St., South Bend, Ind., feature wrenchless adjustment and jaw-locking. Each jaw has knurled knob for adjusting position, and thumb screw for locking. Double-acting compound thread provides approximately 3/16-in. jaw movement for each revolution of adjusting knob.



Hydraulic Couplings

New automatic sealing couplings applicable to aircraft hydraulic systems are offered by **Roylyn, Inc.**, 718 West Wilson Ave., Glendale, Calif. Designed for efficient operation over wide pressure and temperature range, features include automatic shut-off upon disconnection and instantaneous flow upon connection. Coupling is available in sizes from ¼ to 2 in., and with valve in either or both halves. When used together, valves are mutually activating to open when connected, and close when disconnected. Valved coupling may be used with open nipple, in which case nipple end opens valve upon connection. When open coupling is used with valved nipple, latter is opened only by flow, giving check-valve action.

Tool Suspender

Model 7072 balancer, for suspending portable tools in shop or production line work, is announced by **Aro Equipment Corp.**, Bryan, Ohio. Adjustable to tools weighing up to 10 lb., lightweight unit has steel-stamped housing and drum. Cable comes out of bottom in line with suspension eye, eliminating twisting or turning of mechanism.

Hose For Hydraulics

Designed to withstand impact of hydraulic power shocks in operation of components in large aircraft, hose developed by **B. F. Goodrich Co.**, 500 S. Main St., Akron, Ohio, is stated to have taken in excess of 3,000 psi. in tests. Construction, featuring high tensile strength, incorporates special Swedish steel wire.

Information Tips

Electronic Voltage Regulators
Catalog released by **Sorensen & Co.**, 375 Fairfield Ave., Stamford, Conn., describes electronic control of voltages and currents, and outlines advantages of providing adjustable output voltage that stays set, more precise regulation accuracies, fast recovery time, and insensitivity to line frequency fluctuations between 50 and 60c. Also contained are photos of applications, circuit diagrams, and efficiency and performance curves.

'Copter Mechanism Lube
Use of chemically toughened grease, Regal Marfak Special, for helicopter lubrication problems is announced by **Texas Co.**, 135 E. 42 St., N. Y. C. Advantages of material are stated to include ability to withstand heavy loads and centrifugal forces imposed by main rotor head, and adaptability for use in rotating bearings of transmission, head, and in control system. Efficient operation is claimed at temperature as low as —40 deg., at —65 deg. where sufficient torque is available, and up to 250 deg.

Self-Centering Drill Turret
Of interest to plant operating personnel is 12-page booklet on "Lign-o-matic" turret, automatically aligning device used on drilling machines, issued by **Howe & Fant, Inc.**, So. Norwalk, Conn. Contained are design features, operating instructions, and specifications.

Paint Stripper
Data is available from **Allied Finishing Specialties Co.**, 2639 W. Grand Ave., Chicago, Ill., on improved cold paint stripper, stated to be non-flammable product, requiring no heat, and able to quickly remove paint, lacquer, enamel, synthetics, varnish, and wrinkles. Neutralizing action is via pressure water flushing or wiping.

Records Instrument Traces
Catalog describing Linagraph films and papers for recording oscillograph traces and similar phenomena has been issued by **Industrial Photographic div., Eastman Kodak Co.**, Rochester 4, N. Y. Included is information on speed, contrast, color sensitivity, and other characteristics determined by requirements of particular instrument.

Thermocouple Assemblies
Information on turbo-engine thermocouples and accessories is offered to aeronautical engineers by **Thermo Electric Co.**, Fairlawn, N. J. Four-page booklet describes temperature measurement of exhaust gases with specially designed assembly of thermocouples and harness, terminal blocks, resistors, and lead wires.

For Oscillograph Work
New 12-page booklet describing oscillograph photography is offered by **Fairchild Camera and Instrument Corp.**, 88-06 Van Wyck Boulevard, Jamaica, N. Y.

Westinghouse research creates new developments for aircraft . . . new opportunities for you

A new era for aviation . . . and new opportunities for you; these are the products of a Westinghouse research program devoted to aircraft. Vast in scope, Westinghouse research involves hundreds of men . . . armed with modern scientific tools . . . in a number of laboratories. This activity has already produced many developments which have benefited aviation—and you—by creating new opportunities in plane design . . . new ways to improve plane performance.

As this work continues, further important developments appear. A few of these, which promise great forward strides in air progress, are discussed on these pages. And Westinghouse will continue to explore new and better methods of solving the problems of aviation.

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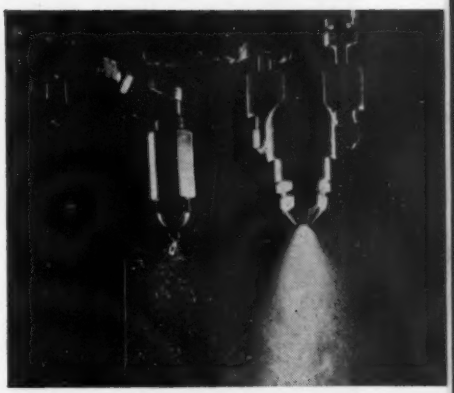
future of flight . . .

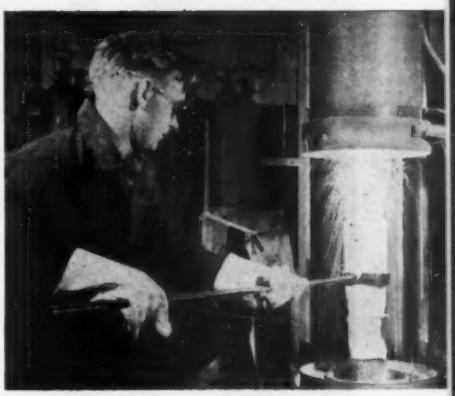
A Super-Fine Fuel Atomizer. Here's a product of Westinghouse research that solves an old problem in fuel combustion—that of imperfect combustion and resultant carbon formation in fuel chambers. It's a new fuel nozzle for aviation gas turbines that provides a spray so fine that superior distribution and greater combustion efficiency are obtained over the entire speed range. This means more power per gallon of fuel, less maintenance and new economy in aircraft operation. The difference between the old and the new is dramatically evident in the photo at the right.



High Temperature Metallurgy. Of enormous consequence to gas turbine engines, jet propulsion and superchargers are recent Westinghouse developments in high-temperature alloys—Refractaloy and Discaloy.

These are not just two alloys, but a family of metals having high strength at high temperatures. Exact proportioning, precise annealing and careful rolling practices give each metal the qualities required for a particular high-temperature application.

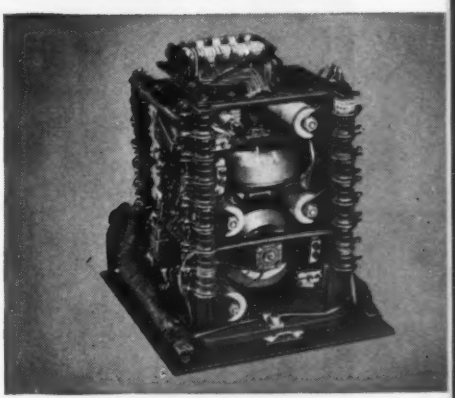
It's a development that paves the way for further advancements in high-temperature jet propulsion and gas turbine engines for aircraft.



The Westinghouse Autopilot. For greater flight safety of tomorrow's planes . . . Westinghouse has developed experimentally a remarkable new flight control system. It utilizes the same gyroscopic principle as the tank gun stabilizer . . . also developed by Westinghouse for 90,000 American tanks.

This new Autopilot can be used either to maintain a fixed course and altitude, or maneuver the plane with a regulated angular velocity in response to finger-tip control. The complete control, of which the Gyro Control Unit (in experimental form at right) is the heart, will weigh between 25 and 50 pounds, depending on the plane to which it is applied.

It is not, at present, available commercially.



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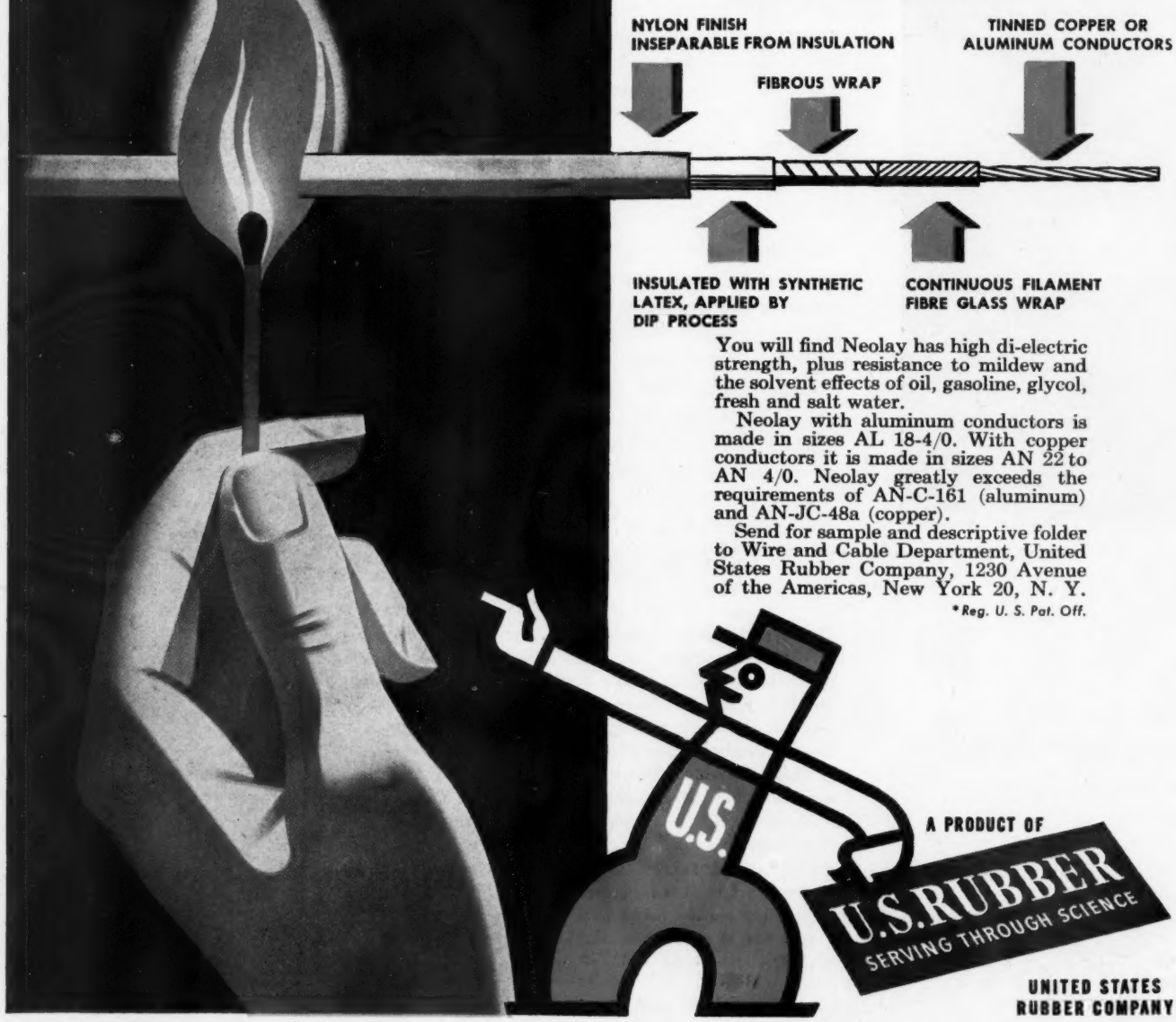
That is one of the reasons why this new aircraft wire provides *thorough* circuit integrity not only under extreme conditions, but at all times.

Neolay is easier to handle and install, because it has a smooth nylon finish, a smaller diameter and lighter weight than the usual aircraft wire. Because of the nylon covering, no fibrous or braid cover is needed. The insulation has the highest physical and electrical properties.



You will find Neolay has high di-electric strength, plus resistance to mildew and the solvent effects of oil, gasoline, glycol, fresh and salt water.

Neolay with aluminum conductors is made in sizes AL 18-4/0. With copper conductors it is made in sizes AN 22 to AN 4/0. Neolay greatly exceeds the requirements of AN-C-161 (aluminum) and AN-JC-48a (copper).

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Bombay Letter

Indian Air Transport Climbing

Despite maintenance and overhaul problems, eight airlines tot up hefty traffic and freight increases.

By J. K. VAN DENBURG, JR.

Air transport in India continues to enjoy a boom that seems to have no end in sight. Official figures for last year recently were announced, showing traffic and freight increases of more than 100 percent.

The eight scheduled lines flew a total of 21 routes, compared to five lines flying 16 routes during 1946. Number of passengers carried rose from roughly 1,000,000 to 2,800,000, passenger miles from 61,000,000 to 137,000,000, freight from 1,300,000 lb. to 4,400,000 lb.

It hasn't all been gravy, however. Modernization of equipment has brought in a lot of British aircraft—mostly Vikings, and a few Wayfarers and Doves. Instead of having overflowing American surplus depots to draw on for DC-3 spares, the lines using British equipment have faced a new worry in getting replacement parts and overhauls. Leading example of this problem is Indian National Airways. It often has been forced to fly its Vikings all the way back to Britain for overhauls because of the non-delivery of replacement parts and the shortage of technical personnel in India.

The Indian plane which crashed into a Corsican mountainside in March with a loss of 15 lives was an INA plane bound for overhaul in Britain.

When and if American manufacturers begin to make sizable inroads into this market they will have to plan well to help their customers avoid the same problems. It also may mean a bigger sales job, for many of the less wealthy lines will hate to switch over to new types with the resultant loss of Hindustan Aircraft Ltd. as a central maintenance depot for DC-3 types.

As things are now the two Constellations recently brought to this country by Air-India International are the only two modern American major transport aircraft out here. Indian Overseas Airlines (formerly Mistry) is still waiting for its 2-0-2s and Pakistan's Orient Airways for its Convair Liners.

In the smaller types of aircraft, America does hold an edge. Ambica Air Lines, agent for Beechcraft, has a few Expeditors in service on its shorter runs. It recently has sold six of them to as many Indian princes. And it has a charter contract with the government which calls for two Expeditors to be flown a minimum of 90 hr. each month on government service. Payment is at the rate of 90 cents a mile.

Smaller models are becoming more and more noticeable, too—Bonanzas, Navions, Luscombes, Cessnas and Pipers. The Bombay firm that distributes Cessnas has recently opened a flying school which uses the 120s.

Of course these planes stand out at the airports. But remember that there are less than 700 licensed aircraft of all types flying in India at present.

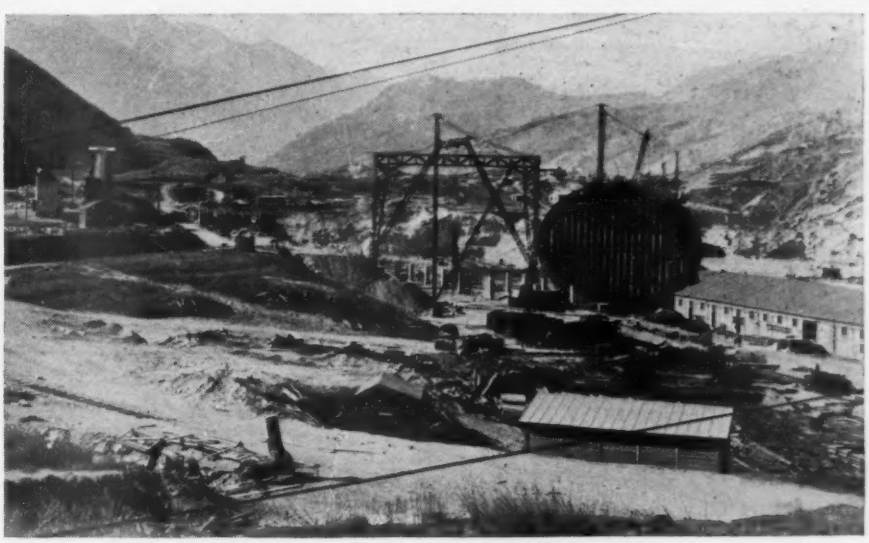
Meanwhile, nationalization continues to hold a corner of the spotlight. The government has announced that it has reserved the aircraft manufacturing industry for itself. This means that Hindustan Aircraft Ltd. at Bangalore, now government owned and operated, will continue for a long time to be the only factory in India. Its current program consists of assembling a handful of British Percival trainers in addition to its conversion and overhaul of DC-3 types. While the government plant is aiming at eventual complete manufacture, such an objective will not be achieved in India for a long time.

As for air transport nationalization, you can pay your money and take your choice of the straws in the wind. The government statement of nationalization policy omitted air transport from its itemization of industries under the gun. But the Ministry of Communications indicated that it did not view the matter as a closed issue just yet.

A special advisory committee to the Ministry, speaking in favor of the principle, urged that a special board "which would include some members with practical experience of aviation" should be appointed to plan a government-run service over an experimental route.

Since here in India the central government owns all the railways and the provincial governments are grabbing off bus and truck lines as fast as they can, the principle of government monopoly of transport is firmly established. Witness the central government control of Air-India International.

In this context, state-owned airlines look like a lead pipe cinch eventually.



WIND TUNNEL FOR FRANCE

Construction is being pushed on France's 1280-ft. Mach 1 windtunnel at Avrieux in the Alps. Shown here is a mammoth elbow which turns air through 90-deg. angle by utilizing hollow fins fitted with adjustable flaps. Tunnel will use power from two 55,000-hp. water turbines housed outside of the tunnel proper at opposite ends of fan installation and connected to the fans by long shafts passing through elbows. It is estimated that it will take approximately a year and a half to fabricate the other parts that are needed for final assembly. French engineers expect, however, to start preliminary expenditures for a Mach 2 tunnel before the end of 1948.

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Scandinavian Airlines Begins Joint Service

STOCKHOLM — Settlement of the Swedish ABA's ground crew strike enables Scandinavian Airlines to begin joint service operations to Europe and the Near East. First route scheduled was Helsinki with connections to Moscow.

The strike blew over just before Apr. 18, with strikers accepting a 10 percent increase.

▶ **Joint Service Arrangements**—At present operating 72 planes, including 50 DC-3s and nine DC-4s, the Swedish ABA, Norwegian DNL, and Danish DDL companies split capital, costs and profits on a 3:2:2 basis.

Joint operations will link 68 key cities on four continents—New York, Buenos Aires and Rio de Janeiro with Amsterdam, Ankara, Athens, Brussels, Cairo, Copenhagen, Geneva, Hamburg, Helsinki, Marseilles, Paris, Prague, Oslo, Stockholm, Warsaw, Zurich in Europe, Istanbul, Cairo, Teheran in the Near East, and Nairobi in East Africa. Regular route network already extends over 100,000 mi.

Top-Flight Airport

Keflavik Airport, former USAF base in Iceland, emerges as one of the top-ranking North Atlantic airports after completion of its first year of successful operation in its new role on a civilian and international basis.

Ever since the field was turned over to the Iceland Airport Corp. in 1946, 1256 trans-Atlantic aircraft carrying 21,726 through passengers, 812,297 lb. of cargo, and 779,351 lb. of airmail stopped off at Keflavik. Of the eleven scheduled airlines operating through the Arctic base, six used Keflavik regularly.

A terminal-hotel, now in construction, is expected to be ready by September. Facilities will include lounge, restaurant, cafeteria, as well as customs and immigration centers, airline offices, post office, and meteorological, communications and flight stations. The second floor of the hotel will have accommodations for putting up 80 people.

BOAC Doubles Traffic

Passengers and freight flown by British Overseas Airways from London to continental cities during March, 1948, more than doubled the totals for the same period last year.

Continental passengers increased from 5716 to 11,470; freight from 136,400 lb. to 365,291 lb. Total weight of mail handled was 5000 lb. Overall distance covered on continental services exceeded last year's mileage by about 50 percent.

CANADA-BERMUDA INAUGURAL FLIGHT

Air link between Canada and Bermuda was inspected April 30 by Dominion Government and international aviation representatives. Boarding the Trans-Canada Air Lines' pressurized North Star at Montreal for an inauguration flight to Kindley Field, Bermuda, are left to right: Dr. E. P. Warner, president ICAO; Hon. Lionel Chevrier, Minister of Transport; R. C. Vaughan, TCA director and president and chairman of Canadian National Railways; Hon. Ernest Bertrand, Postmaster-General; G. R. McGregor, TCA president; and Sir William Hildred, director-general of IATA.

WORLD NEWS BRIEFS

LONDON—

The Woodford Plant turned out its last Avro York last month—the 253rd to roll off the assembly line. Designed by the late Roy Chadwick, the plane was patterned after the Lancastrian heavy bomber, using the same wing but larger fuselage.

JOHANNESBURG—

The Government of the Union of South Africa has invited new proposals for feeder air services due to the fact that operators awarded feeder services last year have since declined them. . . . Solent flying boats have replaced the York land plane on the BOAC Springbok air service between the U. K. and the Union. . . . South African Airlines has been asked by the Union Government to submit bids for a Johannesburg-New York operation, under its U. S. bilateral air pact. Bids are also being asked for a service between the Union and the Netherlands under a similar agreement. Successful bidders will receive all available facilities and assistance, becoming, in effect, a Government instrument.

RIO DE JANEIRO—

A Panair do Brasil Constellation flew from Buenos Aires to Rio in 3 hr. 58 min.—a new record for all types of planes. Panair Connies are now making four roundtrip flights weekly between Buenos Aires and Rio, supplementing Pan American Airways' service.

MILAN—

Construction of the Malpensa Airdrome is being backed by the Union de Suisse Bank, Switzerland. Roughly two and a half million dollars will be put up by the Swiss bank for the new field which will be equipped with steel landing strips and radar.

INDIA—

Air Survey Co., Ltd., subsidiary company in Fairey Aviation Co., formed a new subsidiary company in Pakistan and revised the name of its long-established subsidiary company in India from Indian Air Survey and Transport Ltd., to Air Survey Company of India, Ltd.

MELBOURNE—

Australia's prototype Tudor II, to be built by the Commonwealth, will be fitted out as an ambulance plane, but will not be available in a commercial version. Flight tests are scheduled for early 1949. . . . Melbourne is to be the site of one of the five field offices of ICAO, effective May 1. The new office will be known as the Far East and Pacific Office.

Cross-Country College Course

New methods are used in teaching flying at Stephens College. Results win approval of flight operators.

By ALEXANDER McSURELY

Eight months after introduction of the experimental cross-country curriculum for private pilots, in Ohio, the course is being widely used by flight operators in the Kansas City CAA region, with strong recommendations from them for its continuance.

Frank Trumbauer, assistant to the Regional Administrator for Personal Flying Development, who has been actively sponsoring the use of the course by operators in the Fifth Region, has also introduced some ideas of his own, in addition to those previously reported in AVIATION WEEK (Sept. 29, 1947) which were developed primarily by C.E.A. Brown, Ohio aeronautics director, and Charles E. Cox, Chicago CAA region personal flying development assistant.

▶ **Stephens College Proving Ground**—Main proving ground for the new course currently is at Stephens College, Columbia, Mo., which has emphasized aviation training in its curriculum since 1941. (Stephens girl aviation students have obtained more than 400 private pilot licenses, 35 commercial pilot ratings and 24 instructor ratings, and more than 300 Stephens students have been hired by airlines in traffic and stewardess positions since the aviation department was opened. The department operates one twin-engine Cessna and 16 other planes.)

Kenneth E. Newland, director of aviation at Stephens, lists the following advantages noted in the first year of the cross-country curriculum which is being given to all primary flight students:

- Cross-country in primary stage arouses greater student interest.
- Students are learning maneuvers and at the same time are going somewhere.
- Students become much more familiar with cross-country procedures and strange-field techniques than in previous courses.
- On cross-country flights, the student is able to understand more so that she can ask questions and receive explanations.
- Cross-country flights have developed a higher degree of orientation, a greater awareness of wind direction and wind drift correction, as well as more experience in planning.
- The often dreaded cross-country flights that were an incidental part of the primary curriculum have given way to a much greater emphasis on such flights so that solo cross-country flights now become purely incidental, developing a much greater degree of confidence in the students.

The curriculum as used at Stephens and by several other Fifth Region operators is essentially the same as originated by Cox and Brown, except that the maneuver of figure eights on or around pylons is added to comply with CAA Manual 50.

However, Trumbauer has suggested and operators are using three other interesting teaching techniques.

▶ **Three Other Techniques**—One is the use of "audible instruction" in which the instructor explains to the student audibly the flight maneuver he is making as he does it, and then the student similarly explains the maneuver back to the instructor as he is performing it. This technique is not often used in commercial flight schools, but has been used by the armed services in flight training to advantage.

The principle of "thinking out loud" is designed to keep the student's mind on what he is doing, and it quickly shows the instructor if the student is on the wrong track in some mental process. It starts with line inspection and cockpit check, and continues through to the most advanced type of training. It is expected to eliminate a considerable amount of the beginning pupil's fear, by channeling his mind along the business at hand. A 15-minute blackboard instruction period before flight is regarded as an essential part of this system, so as to insure that the student knows what he is doing, theoretically, before he tries it in actual flight.

▶ **Reports on Success**—Newland reports on the success of audible training at Stephens College as follows:

"We have found the following benefits: The audible method creates greater confidence and realization in the student early in the course, makes the student plan ahead; if the student does not understand the maneuver she cannot talk about it; likewise the instructor has a better chance of knowing whether the student understands; students learn the maneuvers much better if they talk their way through them; analyzing the maneuver orally clarifies and simplifies the maneuver; during solo periods the student is much better in self-analysis; student assumes more responsibility in correction of errors, rather than depending on instructor; a student who has received a commercial license under this method should have no difficulty in receiving a flight instructor's rating."

▶ **CAA Inspector Reports** — A report from James P. Colton, CAA inspector, received by Trumbauer, bears out the last point made by Newland. Colton reports: "On Dec. 15, 1947, I conducted two flight instructor flight tests at Stephens College. Applicants were Marlin Lee Foster and Nancy Field Tack. This school has been using the audible training system since the start of the school year in September. These two applicants had been started on this audible training system while enrolled in their commercial course. It was plainly evident during the flight test that this training had been a definite aid in preparing them for the flight instructors' course. It appears to me that if this system is used from the start, by the time an applicant reaches flight instructor stage, as far as eligibility requirements are concerned, the flight instructor test would be merely a formality."

Trumbauer's other two training sug-

Sales Angles

Three of the principal manufacturers of personal planes have indicated considerable interest in the new experimental cross-country flight curriculum for private pilots. Stinson Aircraft is reported encouraging its use by Stinson dealers as a part of getting more utility out of the personal plane. Cessna Aircraft Corp. is preparing to circularize all Cessna dealers urging them to adopt this course of study, and Beech Aircraft Corp. also has indicated strong interest. Widespread use of the plan, which provides for training during varying conditions at various airports, instead of local flying around a single airport, is expected to prove an important factor in increased sales of small planes for business travel.

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Since 1917, when the first Exide Batteries were used in aircraft, they have flown the airways on a majority of American built planes. And down through the years, Exide engineering and manufacturing skill has kept pace with aviation's fast growing needs.

Whatever the type of plane or service, there is an Exide Aircraft Battery to meet all storage battery needs . . . with dependability, safety, long life and economy.

Write for copy of Exide Aircraft Battery Catalog, which includes the Exide Battery price and replacement data sheet.

1888 — Dependable Batteries for 60 years — 1948

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32
Exide Batteries of Canada, Limited, Toronto

gestions are a method for accuracy landing, and use of an operational altitude chart.

▶**Accuracy Landing**—In making landings, the pilot is directed to establish the proper angle of crab necessary to glide along a straight track at a right angle to the landing direction maintaining a constant gliding speed. The pilot then selects a spot ahead of him, where the plane would land if he continued gliding without changing direction. He also selects the spot on the landing field where he wants to put his airplane down. When he reaches a place in his glide where the plane is the same distance from the theoretical straight-ahead landing spot and from the spot where he wishes to make an actual landing, he makes his turn and continues his constant rate of descent to a spot landing.

The operational altitude chart shows the pilot the effect of temperature on air density, a factor which is being taken into consideration by airline pilots, but which the private flyer ignores, too frequently, to his sorrow. The chart omits the factor of barometric pressure for simplification, but Trumbauer states that figures given are sufficiently close to eliminate possibility of pilot's exceeding limitations of his airplane in contact flying weather.

In addition to the reports from Stephens College, Trumbauer cites other favorable experience reports on the cross-country course from Esmond Avery, Aero Service, Inc., Omaha Municipal Airport, Neb.; John A. Clinch, Clinch Flying Service, North Platte, Neb.; Carl B. Lang, Lang Flying Service, Omaha Municipal Airport; W. J. Coombs, aviation education supervisor, Des Moines Technical School; and Willis G. Scott, flight instructor, Webster City Flying Service, Iowa.

Robinson Sales Promotion

Robinson Aviation, Inc., Teterboro, N. J., has opened an extensive sales program pegged on the idea of flying and ownership, a specific product, and the services of Robinson Aviation. Directed toward selected groups in the New York-New Jersey sections, the program (in the form of a four-page colored brochure) emphasizes the personal enjoyment and practical aspects of flying, in addition to the particular qualities of the Stinson Voyager and the Aeronca Super-Chief.

Robinson outlines its ground service in detail, including "flat-rate" quotations on maintenance work.

The company mentions that free instruction will be given after the purchase, or if the customer prefers to learn beforehand part of the cost will be applied to the purchase of a new aircraft.

ABE BOWLER stands by his plane on the landing strip at . . .

. . . Larson's Bar which was only 750 ft. long until river fill added another 650 ft. to it.

'Brush Operator' Aids Fire Control

Working off small landing strips in forests of Pacific Northwest, fixed-baser saves money and manpower.

Bowler Air Service, Orofino, Idaho, is saving manpower and money for the U. S. Forest Service and timber interests in the Pacific Northwest.

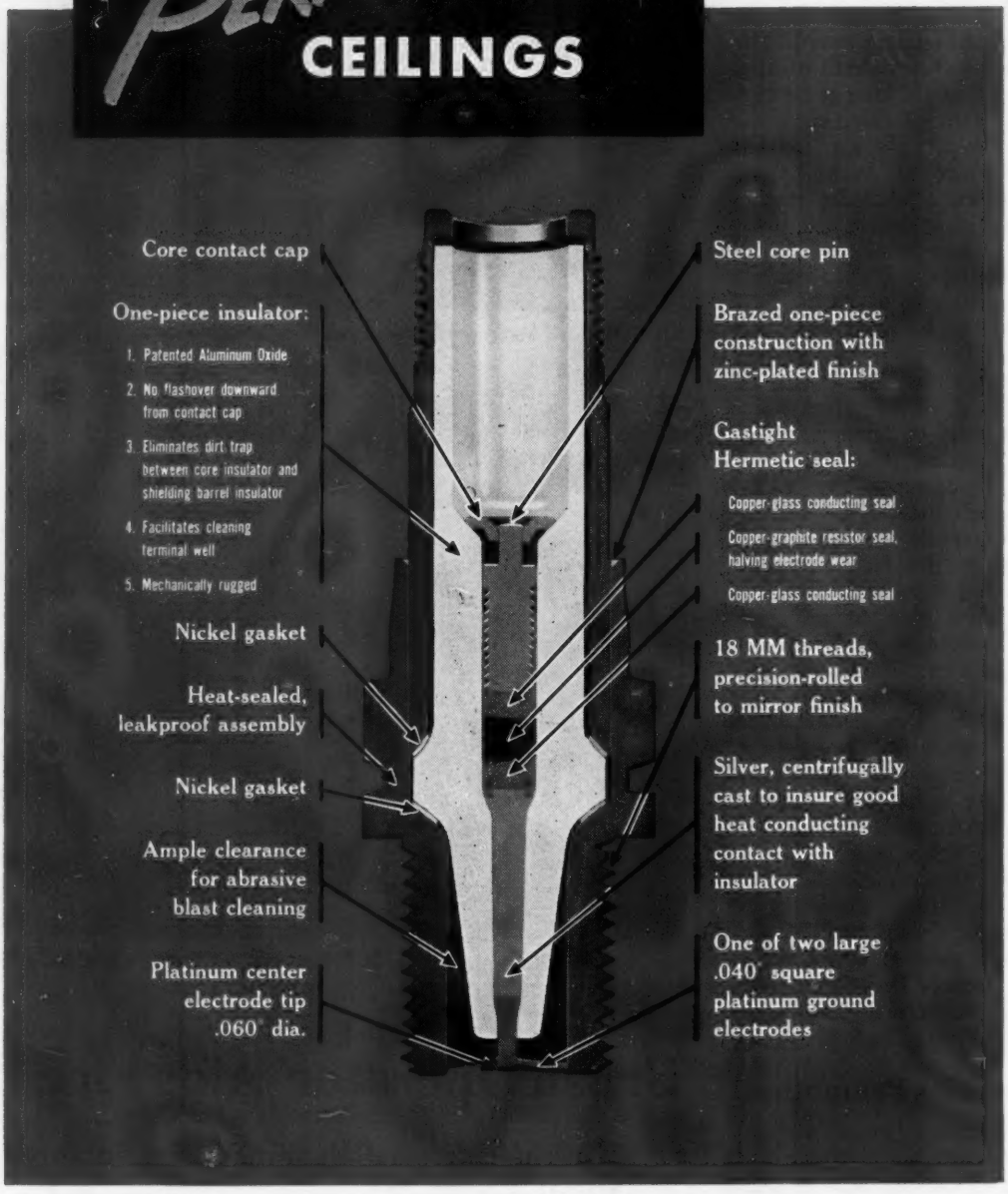
Operating off landing strips from 1400 to 1800 ft. long, Abe Bowler's planes (he operates a dozen Cubs and a Stinson) patrol the forests while pilots spot fires and direct fire-fighting activities. USFS and such private groups as the Potlatch & Clearwater Timber Protective Association are thoroughly sold on use of the aircraft in this work.

▶**Replacing Lookouts** — Traditional method of detecting fires has been to post lookouts on high mountain peaks. The Potlatch & Clearwater Association, covering the large industrial area and the white pine forest of northern Idaho, has about 40 such lookout points. Bowler's planes have made it possible to eliminate a number of the lookout points and to man them for a shorter period.

"The use of planes aids us to insure proper control measures," says A. B. Curtis, chief fire warden of the Potlatch & Clearwater Association. "We can cut costs because we know conditions and can send enough men and equipment in time."

▶**Chief Value**—Curtis sees the greatest value of planes in fire detection work as the gathering of more specific

SETS NEW PERFORMANCE CEILINGS


Core contact cap
One-piece insulator:
1. Patented Aluminum Oxide
2. No flashover downward from contact cap
3. Eliminates dirt trap between core insulator and shielding barrel insulator
4. Facilitates cleaning terminal well
5. Mechanically rugged
Nickel gasket
Heat-sealed, leakproof assembly
Nickel gasket
Ample clearance for abrasive blast cleaning
Platinum center electrode tip .060" dia.
Steel core pin
Brazed one-piece construction with zinc-plated finish
Gastight Hermetic seal:
Copper-glass conducting seal
Copper-graphite resistor seal, halving electrode wear
Copper-glass conducting seal
18 MM threads, precision-rolled to mirror finish
Silver, centrifugally cast to insure good heat conducting contact with insulator
One of two large .040" square platinum ground electrodes

AC's great new Type 181 Aviation Spark Plug is currently approved by Pratt and Whitney and C.A.A. for the Hornet E-3 (R-1690), Twin Wasp C (R-1830), Twin Wasp D (R-2000), Double Wasp (R-2800), and Wasp Major (R-4360).

AC's new Aviation Spark Plug for commercial plane engines incorporates a combination of engineering features not to be found in any other plug . . . features which set new ceilings in performance, length of life, durability, and ease of servicing. Heading the list of these features is AC's patented one-piece aluminum oxide insulator. Look at the cutaway view and you'll see the others.

In all respects, the AC-181 is in step with the latest trends in engine design . . . and fully meets their needs.

AC AVIATION SPARK PLUGS

Aviation Sales Dept. • AC SPARK PLUG DIVISION • GENERAL MOTORS CORPORATION • Flint 3, Mich.

information on such matters as the exact location of a fire, its behavior, rate of speed, fuel type, slope and exposure, all of which are difficult to obtain in some instances from lookout point detection.

Most of the association's air work is directed by "brush pilot" Abe Bowler. He uses his Stinson for cargo dropping. The Cubs are specially equipped with 85-hp. engines, rather than the usual 65 hp., to give a safe cruising time of an hour and a half. Plans are being made to install shortwave radios so communication can be maintained between the planes and the men on the fire line who also have short-wave radios.

▶ **Landing Fields** — Four airfields are available for use in the area and another is being planned on Mountain Meadow near Headquarters, Idaho, about 50 miles east of Orofino. Existing fields are at Orofino, Elk River, Larson's Bar and Big Island, the latter three from 25 to 75 miles northeast of Orofino. The Larson's Bar field was only 750 ft. long when built two years ago on a river bar leveled with a bulldozer but action of the river has lengthened it to 1400 ft. The Big Island runway is 1800 ft. long.

"During some years we have dropped as much as 300 or 400 cargo chutes loaded with food, fire equipment, bedding and supplies to the fire crews along the fire line," said Curtis. "In some instances we have supplied a camp of 200 or more men via air. We have done such things as dropping hot lunches fresh from the cook house many miles away and also ice-cold beer for weary fire-fighting crews."

▶ **One Day's Work**—The airplane really proved its worth as a fire-detection instrument for the association one day and night late last summer, when three lightning storms started 52 fires in the dry forest. As the rest of the season saw only 19 other fires, seriousness of the situation that night could not be overestimated.

Every one of the 52 fires might have grown to wipe out millions of dollars in forest payrolls, but did not, thanks in part to the aid of the airplane.

When Curtis wanted to direct men from one fire to another more serious one, the message often was delivered by shouting from a glide with the motor throttled down. Men on the ground could hear such messages from an altitude of 500 ft. or higher. Written messages also were dropped to ground crews, as were food and bedding.

By evening of the day after the storm, all the fires except two were manned. These two were not smoking much and Curtis had some trouble getting men close enough so the planes could guide them in. By the afternoon of the next day, all fires were under control.

BRIEFING FOR DEALERS & DISTRIBUTORS

MAP OF THE MONTH CLUB—Smart method of merchandising aeronautical charts, adopted by Southwest Airmotive Company, Dallas, and named "The Map of the Month Club" has resulted in sale of approximately 3300 charts in the seven months of operation. It has reduced company's loss on maps due to obsolescence from about 800 in the previous year to less than 30 in the period the plan has been operating. Southwest's Manager Fred Kennedy sent out an introductory letter to pilots on the company's mailing list, asking them to indicate the types of map they use and areas in which they were interested. A file was set up with a card for each of the maps and names of individuals interested in revisions. As semi-monthly bulletins on map changes are received from the U. S. Coast and Geodetic Survey, charts are ordered according to needs shown by the file, and a week later the new charts are in the hands of customers at the regular 25 cents per chart charge. Club provides automatic service to pilots on sectionals, flight charts and World Aeronautical Charts, and on special request provides replacements on approach and landing charts, local charts, World Aeronautical Charts outside the U. S., direction finding charts and 3060B planning charts. Southwest Airmotive is also selling a kit of all 43 WAC charts for the U. S. at a flat price. Principal advantages in automatic service plan seen by Southwest are improved customer service, efficient inventory control, and a resulting small but growing profit on an item which is usually merely a customer service and not a money-maker for the average operator.

ALABAMA AIRMARKING—Alabama Aeronautics Department has asked for bids on the second state airmarking project, to be completed on or before Nov. 1. Asa Rountree, Jr., State Aeronautics Director, reports 43 markers were completed as of May 1, in Air Marking Project 1. When both painting projects are completed, they will give a total of 314 markers in 269 towns and 45 airports. An additional 17 towns in eastern Alabama will be airmarked with CAA funds, making a total of 331 new markers for the state, which will be one of the best airmarked in the South on completion of the program.

ALFREDO TO BRAZIL—First of the Cessna four-place 170s to be exported is being flown to Sao Paulo, Brazil, by Alfredo de los Rios, native Chilean and veteran aviation salesman. Formerly export manager for Fairchild and later for Luscombe, and organizer of the Inter-American Escadrille, private flyer group designed to encourage increased personal plane flying between the Americas, de los Rios' new South American assignment is in development of Cessna sales in northern Brazil. The 170 will be delivered to Cassio Muniz, Brazilian distributor for Cessna, and is the first of a number already ordered from Brazil.

ONE SALE AVERAGE—The new Harvard University Business School analysis of Personal Aircraft Business by Lynn Bollinger and Art Tully (AVIATION WEEK, May 10) concludes that the total 1947 personal aircraft sales represented about two planes apiece for each of the approximately 8000 operators. However when it is considered that a large proportion of the sales were to operators, for training planes, demonstrators for their own use, etc., 1947 sales to other than operators average out to about one plane to the operator. And that, of course, isn't enough to build a very healthy business. Going one step beyond their calculation, if it is taken into consideration how many of the personal planes were sold by a relatively small group of operators, who are "on the ball" from the merchandising standpoint, and who take the trouble to ring a few doorbells and let the public know where there are airplanes for sale, the number of operators who did not even sell one airplane during 1947 must be two thousand or more.

PILOTS' SAFETY CONFERENCE—A recent Salt Lake City meeting on air safety, attended by more than 70 private flyers, may lead to a national impetus on flying safety promotion which has been lacking heretofore. Among the speakers at the meetings, sponsored by Utah Safety Council, were: Dr. Dean Brimhall, CAA assistant administrator for research; Joe Bergin, Utah aeronautics director; Joe Marriott and Marshall Beeman, CAA regional administrator, and assistant for private flying development. Greater emphasis on eliminating pilot carelessness was urged by Bergin, who reported on 31 fatalities in Utah from 1941 to 1947 inclusive. Of the total, all but four would have been eliminated if the pilots had observed regulations and taken reasonable precaution about spins and stalls, he asserted. "Private flying is as safe as we choose to make it," Bergin added. It would be a progressive step if similar state meetings could be arranged through CAA and the National Safety Council and state areonautics agencies. Such a step is now being considered by the Council.—ALEXANDER McSURELY

FINANCIAL

Pan American Reports Its Position

Estimated net income for 1947 shows continued profitable trend, qualified by CAB action on their mail pay.

Pan American Airways continued its profitable trend of operations with a reported estimated net income of $2,960,000 for 1947. This represents but a slight variation from the $2,983,000 net profit reported for 1946. The composition of the income elements, however, differs widely for the two years in question.

The company reported a consolidated book value of $14.65 per share. This gives Pan American the distinction of being the only certificated passenger airline whose book value is higher than the prevailing market quotations of its stock.

In viewing 1947 results, however, important qualifications must be noted which under certain circumstances may sharply alter the published income accounts and balance sheet. Presumably it is for this reason that President Trippe was careful to qualify 1947 earnings as "estimated."

▶ **Hinges on Mail Rate**—The actual results for 1947 and even for 1946, as well as for previous years to a lesser degree, will not become conclusive until certain mail rate proceedings are completed. The company is awaiting the determination of permanent mail rates by the Civil Aeronautics Board on its Pacific services from Nov. 16, 1945, and on the Alaskan and Atlantic services from Jan. 1, 1946. While a permanent "service" rate is now in effect for the Latin American division, the carrier is seeking additional compensation on this service from Feb. 29, 1944, through Aug. 31, 1945.

Temporary rates are now in effect for the Pan American system, with the exception, of course, of the Latin American division. Such rates are of an interim nature. In calculating its mail income, the company has used such rates as a basis and estimated additional mail revenues anticipated in accordance with its own interpretation of what it should receive under the terms of the Civil Aeronautics Act.

▶ **Accounting Change**—This qualification makes somewhat tenuous the reported results for Pan American and is worthy of further analysis. An interesting change in accounting treatment of mail revenues is also evident in 1947 as compared with 1946.

For 1946, the company projected total U. S. mail revenues at $22,130,723. However, this was made subject to a reserve of $8,953,249. In other words, considerable doubt is raised as to the substance of the projected mail revenues. The ultimate disallowance of any portion of such mail revenues will automatically have the effect of reducing reported earnings for that year by a corresponding amount (subject to tax adjustments).

This same condition obviously holds true with the ultimate treatment of projected 1947 mail revenues and reported net income.

The addition of the 1946 mail reserve increased this account to a total of $13,659,935 as of that year-end. Applied against the estimated additional U. S. mail revenues of $23,526,894, this indicated a net amount of about $9,867,000 which, for practical purposes, Pan American fully expected ultimately to take into its accounts for that and previous years.

▶ **1947 Revenues Split**—For 1947, the company shows its U. S. mail revenues in two sections in its income account. Based on temporary and final rates, a total of $16,813,141 is indicated and can be assumed to be definite without further question. Also shown are additional revenues for carriage of U. S. mail anticipated by the company as $5,722,613. This amount is subject to a $1 million reserve. Here again, a doubt is cast upon final reported 1947 net income figures. In other words, should this entire $4,722,613 in projected additional mail revenues be disallowed in the final CAB proceedings (an unlikely event), Pan American will have its profit as reported for 1947 converted to a deficit.

But this seems unlikely.

At the 1947 year-end, the reserve against additional U. S. mail revenues shows a balance of only $4,710,296. Applied against the anticipated mail revenues, this leaves a net figure of $7,257,447 which is a substantial improvement over the previous year's balance sheet.

Particularly noteworthy is the all-time peak of $9,091,747 in unearned transportation revenues as of Dec. 31, 1947. This is a source of both strength and weakness. In a broad sense, this represents paid-up advance bookings and presumably will appear in the revenue accounts for the subsequent periods. However, such bookings may also be cancelled, and in that event, Pan American would be confronted with a liability in making refunds on these cancellations.

▶ **Borrowings**—In October, 1946, Pan American arranged a line of bank credit enabling it to borrow up to $40 million at any time during the period ending June 30, 1948. Largely due to the delays in mail rate determinations, such loans reached a peak of $36 million in May, 1947. Late last year, however, substantial mail payments for mail services in the years 1944, 1945, 1946 and 1947 were received. Such partial payments permitted Pan American to make a reduction in its bank borrowings to $8 million.

At the last year-end, the company had commitments for the purchase of airplanes, engines and related equipment approximating $38,500,000. Such commitments are expected to require a cash outlay of about $27 million. The method of financing this program remains undisclosed. As noted, the bank loan agreement is about to expire. It is possible a new bank loan arrangement may be made for temporary financing. Depreciation came to less than $15 million last year and is hardly expected to contribute the necessary cash for capital expansion this year. Pan American's net working capital as of Dec. 31, 1947, amounted to only $13,765,000.

In reporting on its application for domestic routes, the company merely notes that "as yet, no decision has been handed down by the Civil Aeronautics Board." Completely ignored are the adverse recommendations advanced in the noteworthy findings issued by an examiner for CAB in the early part of this year.

▶ **Hotel Program**—Also excluded from any notation in the annual report is the company's participation in hotel development and acquisition programs in Bermuda and Latin America. It is possible that while Pan American announced its participation in such projects, the actual cash and financing may be from other sources. In South America, for example, it is known that the Export-Import Bank may turn out to be the chief underwriter of the hotel program.

Despite the rapid growth of a number of domestic carriers in the foreign field, Pan American, with net assets in excess of $123 million, remains the colossus in the air transport industry. Its balance sheet, however, contains far more imponderables than that of any other airline.

—Selig Altschul

AIR TRANSPORT

ATA Wants Government Traffic

Amendment to Civil Aeronautics Act would require use of scheduled lines for Federal passengers and cargo.

Government passengers and cargo moving by commercial airlines will be channeled almost exclusively over certificated U. S. carriers as a matter of law if a proposal made by the Air Transport Association is approved by Congress.

A suggested bill providing for amendment of the Civil Aeronautics Act has been drawn up by ATA with an eye to possible increases in government business resulting from implementation of the European Recovery Plan and the rearmament drive. U. S. contract carriers and foreign airlines would be subject to loss of considerable traffic under the proposed legislation.

▶ **Previous Fight**—The ATA move recalls the fight early this year between certificated and contract carriers over air transportation of Army dependents from the West Coast to Tokyo and other points in the Orient. At that time, ATA urged the Government to adopt a policy of employing only certificated airlines for needed Government transportation "in every instance where the certificated airlines are adequate to perform the service." (AVIATION WEEK, Jan. 26.)

Secretary of the Air Force W. Stuart Symington decided the issue by offering the certificated carriers on the Orient route—Northwest Airlines and Pan American Airways— as many passengers as they could handle on their regularly scheduled flights without adding extra sections. Contract operators were utilized for the remainder of the traffic.

▶ **New Proviso**—Present provisions of Section 204 of the Civil Aeronautics Act fail to discriminate between types of air carriers eligible for U. S. government business. But under the ATA proposal, this proviso would be added:

"Personnel of the U. S. Government shall travel on aircraft of an air carrier holding a certificate of public convenience and necessity issued pursuant to Section 401—(of the Civil Aeronautics Act), where such aircraft are available unless the necessity of the mission requires use of an aircraft registered under a foreign flag. The Comptroller General of the U. S. shall not credit any allowance for travel on an aircraft of foreign registry in the absence of satisfactory proof of the necessity therefor.

Another proposed subsection would require that "any property shipped by any department, agency or instrumentality of the U. S. Government shall be carried on an aircraft of an air carrier holding a certificate of public convenience and necessity when such aircraft are available." It further provides that "In any loans or grants from appropriated funds made by any department, agency or instrumentality of the U. S. Government to foster the exporting of property, provision shall be made that any such property which is carried on aircraft shall be carried exclusively on aircraft of an air carrier holding a certificate of public convenience and necessity unless, after investigation, CAB shall certify that such aircraft are not available in sufficient numbers or on necessary flight schedules."

▶ **Merchant Marine Parallel**—Part of the proposed Civil Aeronautics Act amendment parallels the Merchant Marine Act of 1936 which requires Government personnel traveling overseas on official business to use vessels registered under laws of the United States. But in the legislation suggested by ATA there would be differentiation between classes of U. S. airlines—certificated and uncertificated.

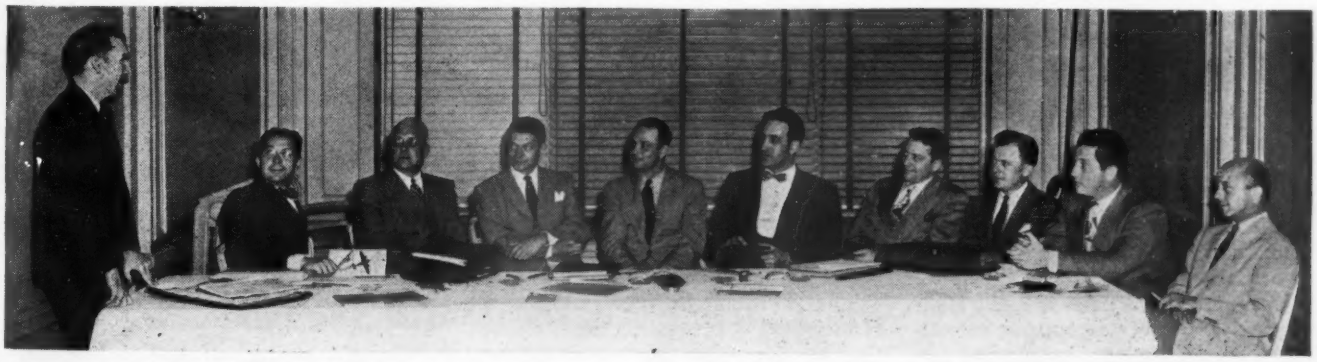
Last December, ATA's board of directors approved a different and less sweeping amendment to Section 204 of the Civil Aeronautics Act. The first draft required Government personnel to travel on "aircraft registered under the laws of the U. S.," rather than on airlines "holding a certificate of public convenience and necessity." The cargo provisions of ATA's proposed amendment are also new.

Tardy Arrivals Reduced

Improved on-time performance is cutting down further on Northwest Airlines' five percent fare refunds to passengers arriving at their destinations more than 30 minutes late.

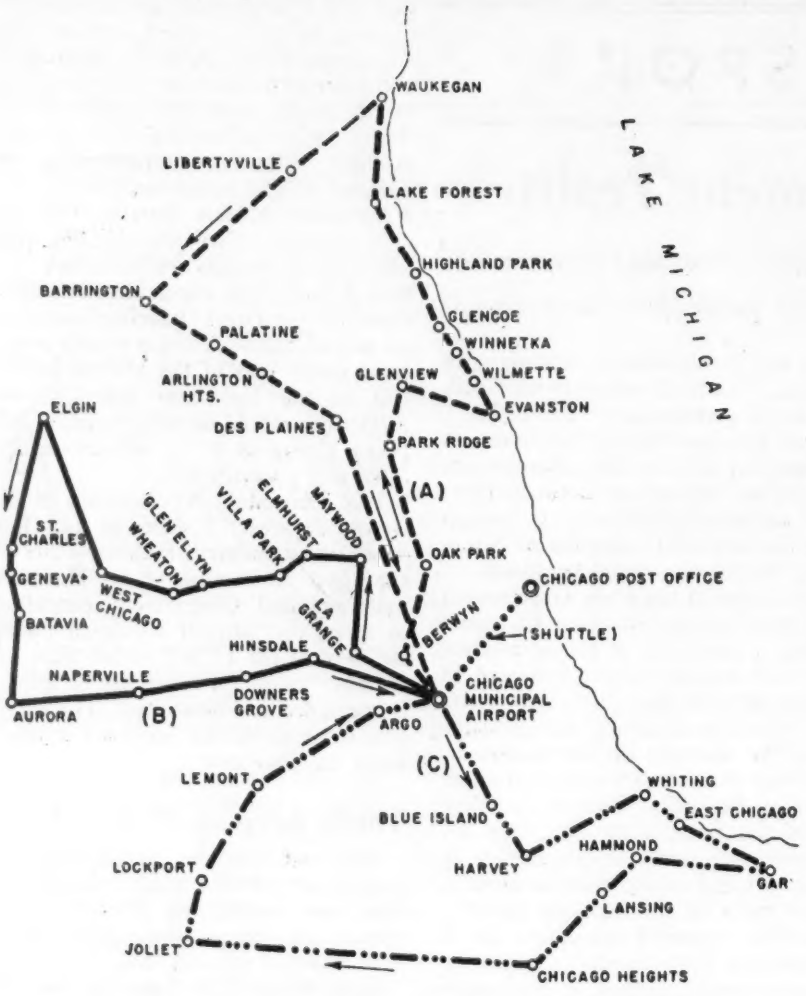
From Mar. 15 to Apr. 14, the first month of the new rebate plan's operation, 91.5 percent of NWA's 5859 scheduled arrivals were either on time, ahead of time or less than 30 minutes late. This on-time record was about 50 percent better than before the system.

Approximately five percent of the 46,195 passengers carried on NWA's domestic flights during the 31-day period qualified for the rebate.



Feeder Traffic Officials Meet in Denver for 'Common Problem' Conclave

Representatives of seven short-haul carriers and the Air Transport Association gathered in Denver recently to discuss common traffic and sales problems. Shown left to right are: Gerald S. Kitchen, who heads the combined traffic and sales divisions of Challenger Airlines and Monarch Air Lines (standing); Oscar Bergstrom, vice president and general traffic manager, Florida Airways; Frank Macklin, administrative assistant, ATA; Stanton B. Danilow, traffic and sales manager, Trans-Texas Airways; Michael E. Cole, general traffic manager, Southwest Airways; Robert England, general traffic and sales manager, West Coast Airlines; Gwin Hicks, general traffic manager, Empire Air Lines; O. A. Byrne, assistant to the president, Challenger; H. H. Hale, assistant traffic manager, Monarch; and John Birdseye, cargo sales manager also representing Monarch Air Lines.



Helicopter Airmail for Chicago?

CAB examiner recommends 5-year temporary mail and property certificate for Hub City's Helicopter Air Service.

Chicago's hope of having helicopter airmail service similar to that already operating in the Los Angeles area has moved a step closer to realization.

CAB Examiner Ferdinand D. Moran this month recommended that Helicopter Air Service, Inc., be granted a five-year temporary certificate to carry mail and property over three circular routes and a shuttle link radiating out of Chicago Municipal Airport. The system, laid out by the Post Office Department, would total about 305 miles.

Moran also urged CAB to grant Helicopter Air Service a temporary exemption to permit the carrier to serve any point within a 50-mile radius of Chicago Municipal Airport. He asked the Board to deny applications by United Air Lines and Anderson Air Activities for helicopter route certificates in the Chicago area.

▶**Operating Company** – Headed by Thomas H. Reidy, Helicopter Air Service was formed for the sole purpose of developing commercial uses of helicopters in Chicago. The company took delivery on a Bell 47-B in April, 1947, and has since used the craft for route surveys, demonstrations, student instruction, power line inspection, exhibition flying and charter work.

If certificated, HAS plans to operate six Bell helicopters over its mail/property routes. The company has secured a firm commitment to purchase its planes at $25,000 each.

The shuttle route recommended for HAS would cover the eight miles from Chicago Municipal Airport to the new Chicago Post Office Building. One circular route would extend from the airport as far north as Waukegan, covering 16 intermediate communities.

▶**Other Routes**—A second route would extend west to Aurora and Elgin, covering 15 points; while the third circular link would reach southwest to Joliet and southeast to Gary, Ind., including 12 intermediate communities.

The Post Office Department endorsed experimental helicopter mail service in the Chicago area following tests made by the Air Force in October, 1946. Better than 50 percent of the airmail dispatched at the offices served was expedited by these tests.

▶**Military Value**—Army and Navy officials have strongly endorsed helicopter airmail operations for the assistance they will give to development of the helicopter generally and to creation of a reserve of trained flight and maintenance personnel. Because of wider extremes in weather, the Chicago experiment would give the military data in addition to that obtained from the present Los Angeles operation, where Sikorsky S-51s are being used.

When Los Angeles Airways was granted its routes last spring, CAB awarded it a three-year certificate. Moran's recommendation of a five-year certificate for HAS is in line with general recommendations covering future experimental operations made by the President's Air Policy Commission.

KLM Expects Rise In Passenger Traffic

KLM, Royal Dutch Airlines, is expecting a steady climb in 1948 passenger traffic. And if international conditions remain normal, a much larger increase is anticipated for 1949.

Dr. Albert Plesman, president and founder of KLM, disclosed that overall north-Atlantic airline traffic jumped from 110,000 in 1946 to 220,000 in 1947 and 350,000 is estimated for 1948. Reason for the optimistic outlook is attributed to the five-nation pact signed by England, Holland, Belgium, Luxemburg, and France along with the 16-nation agreement under the Marshall plan which is expected to ease trade restrictions.

▶**Wants Commercial Rights**—KLM at the moment is trying to extend inland routes in the U. S. and is particularly anxious to obtain commercial rights between New York and Curacao. The airline is permitted to discharge traffic at New York en route from Amsterdam to Curacao, but may not pick up passengers at New York bound for Curacao.

Cargo handling will develop in much stronger volume than passenger traffic, Plesman stated. Involved currency regulations and import licenses are the major retarding factors. Income for air cargo, however, will not exceed that derived from passenger traffic. Cargo revenue will amount to about 15 percent of the total.

Win One, Lose One

Feeders get helping hand from CAB, protest on high mail costs from Post Office.

A boost from CAB and another jolt from the Post Office Department have highlighted recent government moves pertaining to the feeder experiment.

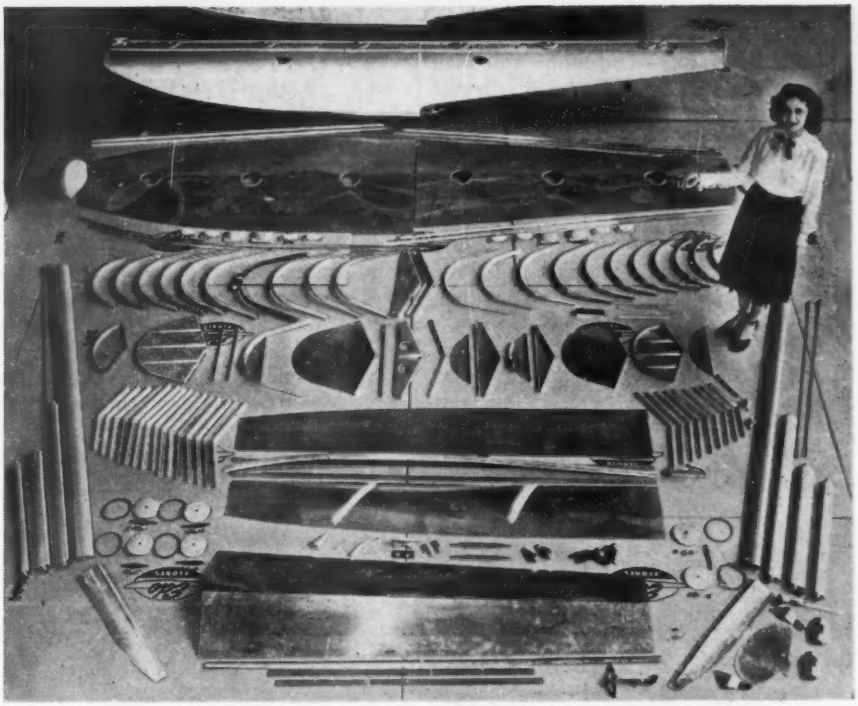
Financially hard-pressed short-haul operators were heartened by the Board's action in offering Southwest Airways a lump sum mail payment of $1,893,658 for the period from Dec. 2, 1946 (when service began) until Mar. 31, 1948. This would enable the company to show a profit on its first 16 months' operations over its Los Angeles-Medford, Ore., routes.

▶**Service Opposed**—But shortly before CAB's action on Southwest, the Post Office Department took the unprecedented step of opposing Iowa Airplane Company's request for issuance of the temporary certificate for which the carrier was designated in December, 1946. Iowa Airplane told CAB sufficient airports are now ready to permit operations over its routes (AVIATION WEEK, Mar. 22), but Post Office officials asked the Board to hold a hearing to determine whether it is still in the public interest to activate the feeder system.

The Post Office Department, which has shown increasing concern over the short-haul experiment in recent months, declared that "the experience of every certificated feeder which has commenced operations to date has proved that its estimates of mail pay needs were too low. The question may well be asked would the Board in December, 1946, have selected Iowa Airplane Company to operate a feeder route if it had realized the probable cost per mile in mail pay subsidy. Changed conditions have increased costs, and the rosy traffic estimates of 1946 have not been realized."

▶**Parallel Links** — Post Office officials said Iowa Airplane proposes bringing service to only nine points not already on an airline, because a number of stops must be omitted due to inadequate airports. They added that with the suspended points, Iowa Airplane's service substantially parallels links of United Air Lines and Mid-Continent Airlines.

In the Southwest decision, CAB showed determination to keep the feeders off the financial rocks for the duration of their three-year certificates so that the short-haul operators will have every chance of proving their worth. At the same time, the Board reemphasized that the feeders must prove capable of operating without excessive government subsidy in the three-year



179 Parts = One Float!

THIS is what it takes to build *one* Edo all-metal lightplane float, — 179 individual parts, castings, metal sheets, reinforcing members and several thousand rivets to put them together. For a complete set of floats, double this and add struts and wires for installation. Little wonder that float equipment seems high priced.

Floats are a complicated compromise. They must combine the best hydrodynamic as well as aerodynamic characteristics; they must be incredibly strong yet extremely light; and they *must be water-tight*. This calls for expensive precision tooling and precision manufacturing.

In the 22 years during which Edo has built better all-metal floats, the whole aviation world has looked to Edo for the best in float equipment. One set of Edo floats has had over two decades of daily use; it is not uncommon to find others with over 15 years of constant use.

Edo has constantly striven to reduce the cost of floats but has steadfastly refused to compromise strength and lasting quality for price.

In addition to building floats, the Edo Corporation's expanded facilities are more and more being relied on by many diversified industries for the construction of precision aluminum components. And EDO's electronics division is pioneering a number of developments of untold importance in this field.

EDO

Edo FLOATS

CORPORATION, College Point, N. Y.

CONTRACTORS TO U. S. ARMY, NAVY AND AIR FORCE

period, or the certificates will not be renewed.

▶ **Added Revenue**—The lump sum mail payment of $1,893,658 to Southwest for the 16 months ended Mar. 31 is equal to 81.14 cents a revenue plane mile flown and gives the carrier about $936,000 in addition to mail revenue already received. Previously, SWA received a maximum temporary mail rate of 60 cents a plane mile, with a gradual decline to 35 cents over an 18-month period.

Southwest badly needed the increase. As of Dec. 31, current liabilities exceeded current assets by $343,000 and the company's net worth was down to $74,000. Despite its troubles, SWA, which owns nine DC-3s and two C-47s, had the highest feeder load factor in 1947—41.6 percent.

During the 13 months ended Dec. 31, Southwest reported non-mail revenues of $712,961 (38.45 cents a plane mile), operating expenses of $2,128,462 (114.79 cents a mile) and a resulting break-even mail pay need of $1,415,501 (76.34 cents a plane mile). CAB specifically noted that SWA in its original plea for a certificate had asserted it would need less than 10 cents a plane mile mail pay.

▶ **Sliding Scale Rate**—For the period after Mar. 31, 1948, Southwest will receive a sliding scale mail rate which varies inversely with the carrier's passenger load factor. The maximum rate of 55 cents a plane mile is applicable when SWA's monthly load factor is 41 percent or less. For each one percent increase in passenger load factor above 41 percent, the mail rate will be decreased six-tenths of a cent.

The company will be able to break even on a load factor of about 37 percent; at 40 percent load factor it could earn 3.7 percent on its investment under the formula; and at 60 percent load factor it could earn a 14 percent profit.

The sliding scale formula is similar to one applied to Pioneer Air Lines last spring. Under it, Pioneer was the only feeder to make a profit in 1947.

▶ **Other Petitions**—Meanwhile, West Coast Airlines and Empire Airlines, which also started operations late in 1946, have issued appeals to CAB for higher mail pay. WCA told CAB it had a net loss of $189,000 from Dec. 5, 1946, through February, 1948. Herbert Munter, executive vice president, said his company will need additional cash not later than June to continue operations, adding that break-even mail pay for the past period would approximate 72.2 cents a plane mile.

Empire declared immediate mail pay relief is imperative. It told CAB that working capital is now entirely exhausted.

▶ **Empire Order**—As a result of Empire's petition, CAB this month issued a show cause order which would extend the period the feeder receives its maximum mail rate of 60 cents a plane mile and would delay decreases in the rate. Under the amended rate schedule, the minimum 35 cents a mile rate becomes effective Apr. 1, 1949, or a year later than under the present temporary formula.

CAB estimates the proposed temporary rate increase will add about $44,800 to Empire's mail compensation for the period September, 1946, to the end of 1947, and will increase 1948 payments by around $90,800.

Excursion Fares Suspended

Fears by Delta Air Lines and Capital Airlines that a rate war might be precipitated by new bargain roundtrip passenger fares proposed by Eastern Air Lines and National Airlines have been allayed temporarily.

The Civil Aeronautics Board has instituted an investigation and suspended for 90 days EAL and NAL tariffs which offered roundtrip excursion rates approximating 125 percent of regular one-way fares between May 1 and Nov. 30. Delta had told CAB that failure to suspend the tariffs would precipitate a general rate war in the industry which would have destructive effects on the financial position of all certificated carriers (AVIATION WEEK, Apr. 19).

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Alpha Pilot Cleared

CAB exonerates the pilots of intoxication charge made by local district attorney.

Charges made last summer that the pilot of the American Airlines experimental plane "Alpha" was intoxicated when his DC-3 crashed into Bowery Bay, near La Guardia Field, on Aug. 8, have been controverted by the Civil Aeronautics Board.

Following an exceptionally detailed investigation, the Board found no basis for statements by a New York district attorney that the Alpha's captain was suffering from alcoholism when he took off shortly before the mishap. On the strength of a toxicologist's report showing alcohol in the bodies of three Alpha crewmen, the Queens County district attorney had indicated he would attempt to force airlines at La Guardia Field to give official alcohol tests to pilots 30 minutes before takeoff time.

▶ **Tanks Break**—Quantities of ethyl alcohol found in the liver and brain of the pilot, co-pilot and a mechanic may easily have been absorbed by the crewmen when they were drowned in a mixture of alcohol and water immediately following the crash, CAB said. A 4-gal. propeller deicing tank located behind the first pilot's seat and a 6-gal. windshield deicing tank located about two feet aft of the bulkhead immediately behind the copilot's seat were punctured in the accident.

"All evidence concerning the habits and behavior of the two pilots and the mechanic killed in the crash was to the effect they reported for duty in a normal and sober condition and that no use was made of intoxicating liquors any time during the day of this flight," CAB declared.

The accident occurred six minutes after the "flying laboratory" took off from La Guardia Field for Rochester. Two minutes after takeoff, the flight reported oil pressure was low on one engine. Permission to land was granted by the La Guardia tower.

▶ **Plane Stalled**—With limited visibility and single-engine operation, the pilot made too high an approach on his first landing attempt. Considerable air speed and altitude were lost in the attempt, and when the landing gear was lowered during the last turn on the second landing approach, sufficient drag was induced to cut the air speed below the minimum necessary to control the plane. It stalled and crashed.

CAB found the probable cause of the accident was that a missapproach procedure was attempted for the second landing without sufficient air speed for single-engine operation. · Investigation showed the oil screen cover plate gas-

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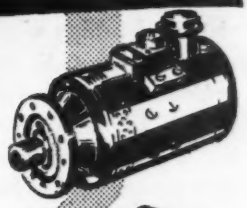

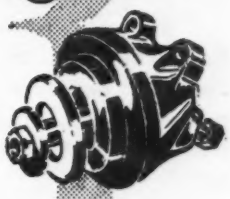

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UAL and Pan Am Give the Stratocruiser the Once-Over

United Air Lines President W. A. Patterson, together with other UAL and Pan American Airways officials, recently visited Boeing Airplane Company's Seattle plant to inspect production progress on the double-deck Stratocruiser. United expects delivery on its seven Stratocruisers early next year, and PAA will receive 20 of the new transports. Shown left to right in the lower lounge of a Stratocruiser are Bill De Valle, PAA; Charles Perry, United; Capt. Frank Crismon, UAL flight manager at Denver; C. L. Egtvedt, Boeing board chairman; UAL President Patterson; Adm. John H. Towers, USN Ret., PAA assistant vice president; and Fred Collins, vice president in charge of sales for Boeing, builders of the giant craft.

ket on the right engine was either fractured when installed immediately prior to the flight or failed soon after take off. As a result, oil pressure for the right engine dropped below normal, forcing the plane to return to La Guardia.

► **Other Factors**—The board said a factor which may have contributed to the accident was that the flight crew had not been told Alpha's calibrated air speed was the same as the indicated air speed. The pilot may have believed the plane, like other DC-3s, had a six miles per hour greater air speed than was indicated on the instrument.

An additional factor may have been that the flat plate drag of Alpha was greater than that in other DC-3s. Included in the plane's electronic equipment was a radar system which necessitated installation of an external radar dome for its operation. This dome was located on the bottom of the fuselage directly below the cockpit. Extra radio equipment required installation of external antennas and antenna posts, and it is estimated the drag introduced by all the additional exterior installations on Alpha amounted to a flat plate area of about two square feet.

McSherry to Idlewild

George M. McSherry, assistant superintendent of LaGuardia Airport since June, 1947, has been named by the Port of New York Authority as superintendent of New York International Airport (Idlewild).

New Routes Favored For Florida Airways

Florida Airways may lose its status as the U. S.' smallest certificated feederline.

A report issued by CAB Examiner Paul Pfeiffer favors enlargement of Florida's present 476-mile system by about 320 miles of new links extending south from the carrier's Orlando base. Six additional certificated stops would be added to the company's routes—St. Petersburg/Clearwater, Lake Wales/Winter Haven, Tampa, Fort Pierce, West Palm Beach and Miami.

Pfeiffer recommended against other extensions, including a link to Pensacola in Western Florida. The feeder's present certificate provides for service along three legs of a route anchored at Orlando and terminating at Jacksonville and Tallahassee.

The examiner agreed in general with Florida Airways' contention that the present route structure is uneconomical for efficient operation, and inadequate to provide service to cities demonstrating community relationships. With the 320 miles of recommended new routes, the carrier would serve a total population of over 700,000 compared to 294,000 at present.

During 1947, Florida airways showed passenger revenues equivalent to less than 10 percent of its operating expenses, Pfeiffer pointed out. Despite mail pay of over $375,000, the carrier suffered a net loss of $163,000 for the year.

TWA, UAL Crisis

Acting swiftly following a finding that TWA and United Air Lines are in a "critical financial position," CAB has ordered new and higher temporary airmail rates for the "Big Five" domestic carriers.

The rates, same as those proposed last month (AVIATION WEEK, Apr. 19), give United an additional $1,414,000 mail pay annually and TWA an extra $1,376,000. Under the same formula, American Airlines' mail pay will be raised about $1,338,000 annually, Northwest's $253,000 and Eastern's $890,000.

CAB's finding that United's financial position is "critical" was the first such analysis by the Board. TWA, on the other hand, advised CAB last month that its cash position was fast becoming precarious (AVIATION WEEK, Apr. 26).

The "Big Five" did not oppose establishment of the new temporary rates. But the carriers are expected to contest strongly fixing of the same rates on a permanent basis.

Air Parcel Post For Scheduled Lines

Independent airfreight operators, bidding for government parcel post business, have taken a setback. The Senate Post Office and Civil Service Committee has approved legislation authorizing domestic air parcel post service exclusively by certificated carriers.

The committee's action was taken upon receipt of a letter from Air Transport Association's executive vice president, Robert Ramspeck, strongly endorsing the legislation, introduced by Sen. William Langer (R., N. D.), chairman of the group. No hearings were held on the measure.

▶ **Cab Position**—In its report, the committee said that CAB Chairman Joseph O'Connell had not "had opportunity to study all of the specific provisions . . . but that, in general" he believes "the bill appears designed to meet the growing need for airmail parcel post service. . . ." The committee's report also disclosed that the Post Office Department "has expressed itself informally as noncommittal" on the measure.

The measure:

- Authorizes the holders of public convenience and necessity certificates to carry mail weighing over eight ounces at parcel post rates, as well as first class airmail.
- Sets down tentative parcel post rates, ranging from 55 cents for the first pound in the first and second zones to 80 cents in the eighth zone, and from eight cents for each additional pound in the first zone to 65 cents for each additional pound in the eighth zone.
- Limits the size of parcels to 100 inches in length and girth.
- Authorizes the Post Office Department to use airmail appropriations for air parcel post facilities at airports.

In his letter to the committee, Ramspeck anticipated that the Langer bill, funneling air parcel post business into the scheduled carriers, would result in lower airmail unit costs, since "airlines could carry much additional mail without having to add additional equipment." In addition, he pointed out, vacant space over feeder and other routes paid for on a plane mile basis could be utilized for parcel post shipments at no extra cost.

New Non-Sched Service

Oswald-Alaska Airlines, to operate on a non-scheduled basis between Boeing Field at Seattle, Wash., and Fairbanks, Alaska, has been organized by Ed and George Oswald of Tacoma, Wash. The company now is converting a Lockheed Lodestar for cargo work, with service expected to begin in June.

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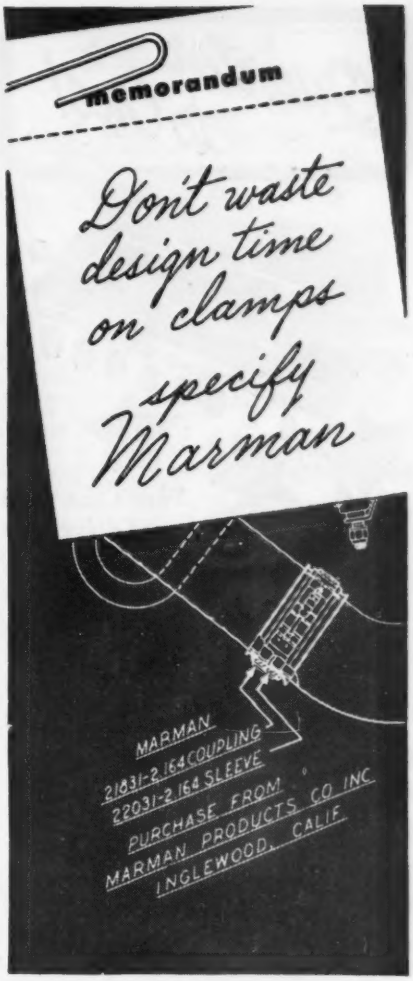

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SHORTLINES

▶ **American**—Has signed an agreement with Hertz Drive-Ur-Self System whereby AA passengers may reserve automobiles in destination cities prior to their departure from other points.

▶ **Aerovias Guest**—Company's request for immediate hearing on its application for a foreign air carrier permit authorizing Mexico City-New York service has been denied by CAB.

▶ **Braniff**—Will augment DC-6 service to Lima, Peru, with reduced-fare DC-4 flights equipped to handle substantial cargo loads in addition to passengers. Individual upholstered leather seats in the DC-4 will fold back against the sides of the plane to provide cargo space which will be separated from the passenger section by curtains.

▶ **Capital**—Reports passenger revenue in first quarter 1948 aggregated $2,739,164 against $2,229,472 in the same 1947 period. Freight and express revenue was $372,520 in first quarter of 1948 compared to $315,833 in the first three months of 1947.

▶ **Eastern** — Earnings in first quarter 1948 were about $2,000,000, according to E. V. Rickenbacker, president and general manager. He said April was well ahead of the same month last year in every category. The EAL executive declared the European Recovery Program and the rearmament drive should stimulate air transportation, adding that the airline industry probably reached bottom last winter and improvement may now be expected.

▶ **Mid-Continent**—Had a net loss of $13,930 in March against a profit of $20,884 in the same month last year. Loss in first quarter 1948 was $104,914 compared to a deficit of $26,456 in the first three months of 1947. Passenger load factor dropped from 66.80 percent in March, 1947, to 55.78 percent in March, 1948, but revenue passenger miles increased from 6,386,476 to 6,860,588. . . . MCA reportedly has decided to buy either Martin 2-0-2s or Convair-Liners as the result of a recent system survey.

▶ **Northwest**— Has reduced its intra-Orient fares as much as 47 percent on flights between Tokyo, Seoul, Shanghai, Okinawa and Manila. . . . Company is preparing to start Martin 2-0-2 service on western portions of its domestic routes within a few weeks. . . . First of five NWA DC-3s sold to China Air Transport Corp. has been flown to Shanghai via the Aleutian route, and other deliveries will follow at the rate of one a month. The planes are part of a fleet of DC-3s Northwest will retire when it gets the 15 additional 2-0-2s now on order.

▶ **Pan American**—Has accepted delivery on its first two Convair-Liners. . . . Company recently signed an agreement with Matson Navigation Co. to promote combined air-sea service between points served by the two carriers. . . . Passenger traffic over the Pacific-Alaska division during the first quarter of 1948 was up 45 percent over the same period last year.

▶ **Pioneer**—Has been authorized to suspend service temporarily at Clovis, N. M.

▶ **United**—Freight ton miles increased from 1,894,579 in first quarter 1947 to 3,727,412 in first quarter 1948.

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CAB SCHEDULE

May 17 — Prehearing conference on Board's investigation of U. S.-Alaska Cargo Service. (Docket 3286.)

May 24—Hearing on Board's investigation of North Atlantic passenger fares. (Docket 3284.)

May 24—Prehearing conference on control of Parks Air Lines. (Docket 1670.)

May 26—Hearing on suspension of All American Aviation's pickup route certificate. (Dockets 2918 and 3293.)

June 23—Hearing on Board's investigation of Pan American Airways' Miami-St. Thomas tariffs. (Docket 3274.)

July 12—Hearing on Capital Airlines mail rate case. (Docket 484.)

July 12—Hearing on National Airlines route consolidation case. (Docket 2967.)

More Salaries Reported To CAB

With a salary of $59,375 in 1947 compared to $50,000 in 1946, United Air Lines President W. A. Patterson was the second highest-paid domestic airline executive last year.

Complete figures filed with CAB show that only American Airlines Board Chairman C. R. Smith ($60,000 in 1947; $50,000 in 1946) topped Patterson. In addition to his $59,375 salary, Patterson listed $4,759 in indirect compensation, representing United's contribution to his retirement fund.

▶ **AOA Reports** — American Overseas Airlines reported that H. R. Harris, vice president and general manager, received $30,741 in 1947 against $30,000 in 1946. C. R. Smith received no compensation as AOA president.

Salaries of other UAL and AOA executives in 1947, with 1946 payments where available in parentheses:

▶ **United**—J. A. Herlihy, vice president-operations, $35,000 plus $2315 indirect ($30,000); R. W. Ireland, vice president-administration, $30,000 plus $4370 indirect ($25,000); Harold Crary, vice president-traffic, $18,500 plus $2475 indirect ($16,500); John Newey, vice president-finance, $17,500 plus $1531 indirect ($17,500); H. E. Nourse, vice president-economic controls, $17,500 plus $1285 indirect ($14,000); R. F. Ahrens, vice president-personnel, $16,500 plus $1105 indirect ($16,500); D. F. Magarrell, vice president-passenger service, $16,500 plus $970 indirect ($16,500); N. B. Haley, treasurer, $13,000 plus $1870 indirect ($13,000); C. H. Blanchar, comptroller, $10,000 plus $435 indirect ($8400); S. P. Martin, secretary, $11,500 plus $687 indirect ($10,500).

▶ **American Overseas**—J. M. Eaton, vice president, $15,411 ($15,000); J. G. Flynn, Jr., vice president, $15,411 ($15,000); William Littlewood, vice president, none; R. E. S. Deichler, vice president, none; C. W. Jacob, vice president, none; H. D. Starr, secretary-treasurer, $11,334 ($9090); T. O. English, assistant treasurer, $4,673; K. Murdoch, assistant secretary, $6473 ($5561); G. Titsworth, assistant secretary, $6225; J. S. Robbins, vice president-European general manager, $27,011 ($15,750); J. C. Gardiner, secretary-treasurer, $7297 ($10,000); R. G. Rose, assistant treasurer, $3960 ($6708); J. E. Slater, board chairman, $10,340 ($25,000).

PAA's Pacific Hopes

Pan-American Airways has set a $24,000,000 quota for 1948 pasenger sales in its Pacific-Alaska division. Passenger sales figures for 1947 are not available, but reportedly are about $20,000,000.

For 3 days, 40 PAA sales executives from San Francisco to Hong Kong aired their sales problems at a conference in Honolulu.

Some conclusions:

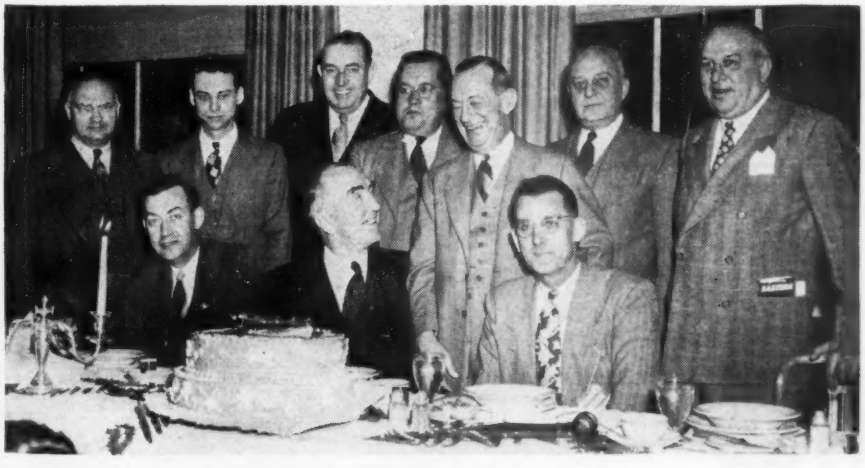
- More money will be spent on improving passenger handling facilities west of Hawaii.
- Pan-Am's biggest business getter is its "Sleeperette" travel.

Plans to extend service to Singapore, Saigon and Rangoon shortly after June 1 were announced.

PAA expects to accelerate its service this year to three and one-half flights daily through the South Pacific, four flights daily through the Central Pacific and fourteen flights daily between Honolulu and the West Coast, said Harvey Hancock, director of traffic and public relations.

Palestine Service

Air mail service from the U. S. to wartorn Palestine has been suspended by the Post Office Department.



Twentieth Anniversary Party for Eastern Air Lines

Celebration of Eastern Air Lines' 20th anniversary, coinciding with a four-day staff conference, brought this group of top EAL officials together in New York recently. Behind the anniversary cake is E. V. Rickenbacker, president and general manager, flanked by T. F. Armstrong, secretary and treasurer, left, and John C. Ray, chief of maintenance, right. Standing left to right are Charles Froesch, chief of engineering; J. Warren Moore, assistant secretary and treasurer; S. L. Shannon, vice president in charge of operations; Paul H. Brattain, first vice president; James J. McCabe, general manager of the Hotel Pennsylvania, New York, who presented the cake; L. P. Arnold and M. M. Frost, both vice presidents at Eastern Air Lines.

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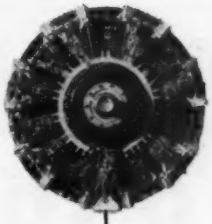

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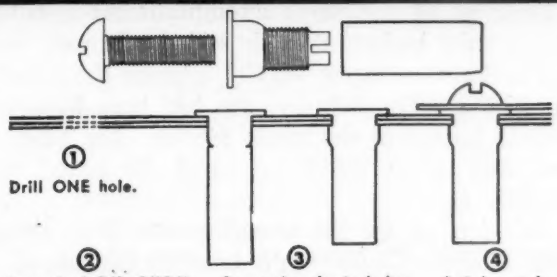
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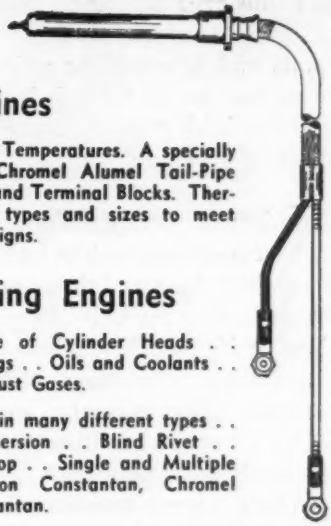

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EDITORIAL

Pooling of Facilities Pays Off

DENVER—President Robert F. Six of Continental Air Lines is convinced that pooling of terminal facilities with other airlines pays off. Continental was one of the few airlines to make a profit last year. Its net income for 1947 was $100,458 after adjustments and tax provisions.

Continental points out that a year ago it was the first company to effect a system-wide consolidation of airport passenger services, baggage handling ramp operations, reservations, communications, ticketing, dispatching and maintenance with other airlines at common points.

In addition to airport operations, mergers of city ticket offices were initiated whenever possible. Hundreds of thousands of dollars have been expended by the major airlines erecting or remodeling downtown salesrooms in the most modern style.

Continental's first pooling program was developed with Braniff Airways at eight cities—Denver, Colorado Springs, Pueblo, Topeka, Kansas City, San Antonio, Lubbock and Wichita Falls.

"Since that time, the success of the consolidation has saved Continental approximately $50,000 a year, with a similar amount probably also saved by Braniff," Continental officials say.

Under direction of Lynn H. Dennis, director of Continental flight service, a continuous review of airport facilities is accomplished, resulting in mergers, consolidations, and eliminations wherever possible. Latest effort is at Santa Fe, N. M., which added the services of TWA and Pioneer Air Lines Apr. 24.

Consolidation has proven most successful at smaller airports and intermediate cities which are served with one or two round trips daily by several airlines. Continental officials candidly concede they cannot paint too optimistic a picture at major airports with heavy flight traffic.

Continental, Braniff, Western, Challenger, and Monarch have combined various facilities at airports in western states, which has saved thousands of dollars for each line, without cutting any public service, but the plan proved a failure at Kansas City, where Continental and Braniff merged their reservations, ticketing and ramp service operations. After a year, Continental returned to its original set-up of handling all of its airport operations with Continental personnel.

"Where a great number of flights is handled daily, it appears impossible for any one company group to provide airport services for another airline," Dennis says. "A saturation point is reached where additional personnel are needed in such quantity that the airlines may as well operate with their individual set-ups. Effective Apr. 1. Continental and Braniff separated their joint service and returned to handling their own facilities."

Another recent merger plan was consolidation of traffic and sales organizations of Challenger Airlines at Salt Lake City and Monarch Airlines at Denver. This was followed a month later by transfer of the management and treasury of Challenger to Denver and a subsequent merging of the maintenance and overhaul facilities of the two lines at Denver Airport.

Prime purpose of all such consolidations, of course, is to reduce airport costs and thus increase operating revenues. Such savings contributed greatly toward Continental's profit last year, Six says. He adds that as airlines increase their services, and more cities are added to the air transport network, the companies must look to such features as joint facilities.

"Airline 'super-service stations' are the first step toward cooperation among the airlines in the joint cause of how to make money, and may produce a change of heart and attitude in an industry which has never been particularly famous for the cooperation among its members," Six says.

In its continuous survey of facilities, Continental uses a yardstick of operations activity at each airport, based on an analysis of the functions and duties of all personnel, job classifications, peak hours, days and seasons affecting all departments, time study of airport and lobby activities to speed the efficient handling of passengers and cargo.

Consolidation of operations at airports means a more efficient use of personnel, reduction in number of employes to serve the lines adequately, elimination of the factor of idle time between flights of an individual line, and greater utilization of space in the terminal building.

Continental's 12 DC-3s will be augmented by five Convairs next summer. The first delivery is expected this month, with two each in June and July. Despite the added costs of putting a new type airplane in service, President Six is forecasting a substantial operating profit in calendar 1948, even after all training expenses in connection with the Convair program are written off in the last half.

Proud of his company's accomplishment in outdoing even a strict budget, Bob Six said the January forecast had indicated a loss of $43,609, whereas the actual loss was $24,623. The February loss had been budgeted at $55,928 instead of the actual $48,969. The March loss had been set at $6554 instead of the actual loss of $10,347.

Six's forecast for the second quarter is an operating profit of about $28,000. "It is definitely felt that all three months in the second quarter will be profitable in an amount to exceed that as forecast," he told other company officials. First quarter passenger revenues increased nearly 10 percent from $563,318 in 1947 to $616,248 in 1948, although number of passengers decreased from 36,315 to 33,514.

Bob Six and his hundreds of employes are proving that pooling and strict budgeting can keep an airline in the black, even in these days of fantastic costs.

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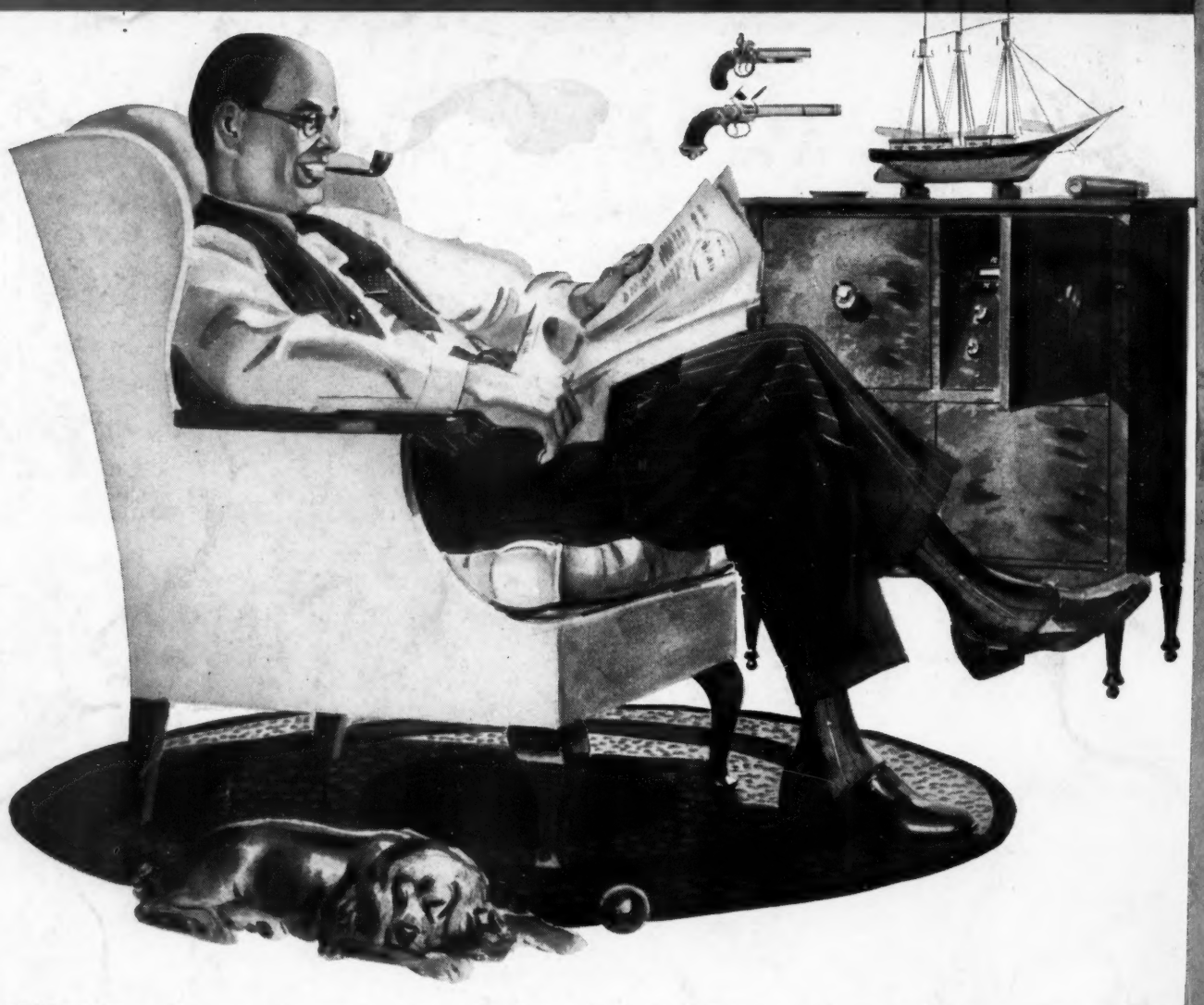

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